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POLLUTION OF THE INTERSTATE WATERS OF THE GRAND CALUMET RIVER, LITTLE CALUMET RIVER, CALUMET RIVER, WOLF LAKE, LAKE MICHIGAN AND THEIR TRIBUTARIES. PROCEEDINGS OF CONFERENCE HELD AT CHICAGO, ILLINOIS ON MARCH 2-9, 1965.

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328

UNITED STATES DEPARTMENT
OF
HEALTH, EDUCATION, and WELFARE

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Conference in the matter of pollution of the interstate waters of the Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and their tributaries (Indiana-Illinois).

****

MR. MURRAY STEIN, Chairman

****

McCormick Place
Banquet Room
9:30 o'clock a.m.
March 3, 1965
Chicago, Illinois

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CONFEREES:

MR. H. W. POSTON,

Department of Health, Education, and Welfare,
U.S. Public Health Service, Division of
Water Supply & Pollution Control,
Regional Program Director, Illinois

MR. BLUCHER A. POOLE, Technical Secretary, and
MR. PERRY MILLER,

Stream Pollution Control Board,
State Board of Health, Indiana.

MR. CLARENCE W. KLASSEN, Technical Secretary, and
MR. RICHARD NELLE,

State Sanitary Water Board, Department of
Public Health, Illinois.

MR. FRANK W. CHESROW, President, and
MR. GEORGE A. LANE,

The Metropolitan Sanitary District
of Greater Chicago, Illinois.

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CHAIRMAN STEIN: Let's reconvene.

I would like to call on Mr. Poston.

As was indicated yesterday, there is another Federal representative who came here and we will have an opportunity of hearing from him.

Mr. Poston?

MR. POSTON: The Department of Interior asked that its statement be withheld until this morning, when Mr. Harold Jordahl could be present and I would like to hear from Mr. Jordahl now.

MR. JORDAHL: Thank you, Mr. Poston, conferees, ladies and gentlemen:

What I would like to do, Mr. Stein, is to ask that the statement which I have provided to you earlier be inserted in the record. I will just give the comments I have about the presentation.

The Department of Interior is pleased to offer its cooperation to the Public Health Service and to the States of Illinois and Indiana in the matter of pollution at the southern end of Lake Michigan.

Our Secretary of the Interior, Stuart Udall, in a statement before a subcommittee of the House Committee on Government Operations early in 1963 expressed the Department of Interior's interest in maintenance of clean water as follows:

The focus of Interior effort is directed to the maintenance of adequate national water supplies and adequate water quality for whatever uses man may wish to make of this valuable resource. The Interior approach emphasizes the coordination and interrelation between uses and the effect of these uses on management and quality of the total water supply system.

Our Department has a rich background of experience and knowledge in this area, and we are equipped with highly qualified technical manpower.

All bureaus and offices of the Department have an interest in water resources. In the Great Lakes, our Bureaus of Outdoor Recreation, Commercial Fisheries, Sport Fisheries and Wildlife, Mines, Geological Survey and National Park Service have a direct interest.

Our Bureau of Outdoor Recreation was established by the Act of Congress on May 28, 1963, as a result of recommendations made by the Outdoor Recreation Resources Review Commission, to provide a focal point in the government for the nation's outdoor recreation activities. The Congress took this action because they deemed it desirable that: I, All American people of present and future generations be assured adequate outdoor recreation resources, and II, prompt and coordinated efforts be made toward conserving, developing and utilizing such resources for the benefit and enjoyment of the

American people.

Thus, it has become the purpose of this Bureau to fulfill these desires of Congress.

The area under consideration includes much of the Chicago-Northwestern Indiana Standard Consolidated Area as defined by the United States Census. It had a 1960 population of about 6.8 million, an increase of 21.6 percent over the 1950 population. As such, it is an area of rapidly increasing recreational needs where, at the same time, areas suitable for recreation development must compete with industrial and other development.

It has been established through studies by the Outdoor Recreation Resources Review Commission that our greatest need is for outdoor recreational areas near population centers.

ORRRC studies further indicate 90 percent of all Americans participate annually in some type of outdoor recreation, with 44 percent preferring water-oriented recreation, mainly swimming.

Now, this region with its near 7 million local inhabitants, adjoins Lake Michigan, one of the largest bodies of fresh water in the world. This lake is a real treasure for those able to use it for outdoor recreational activities.

However, the pleasure of swimming in its cooling waters or sunbathing along one of its sand beaches after a sweltering day at work is not available to many of the thousands who live along its shores.

For example, Hammond, Indiana, with its 112,000 population, has about a quarter mile of public beach. Such a beach, by accepted standards should support a daily attendance of 2,000 to 3,000 people, affording thousands of local people the opportunity to enjoy conveniently water-oriented outdoor recreation throughout the summer.

Such is not the case, however: the beach has been closed for more than fifteen years by order of the local Board of Health, because the quality of the water makes it unsafe for swimming. Official beach attendance is zero. Thus, it is estimated 150 to 250,000 activity days of swimming are lost annually due to the closure of this beach.

A portion of the local water-oriented recreation needs of the area are met in the form of swimming pools. A recent Indiana Department of Health survey indicates that, while Lake County had nine outdoor pools in 1960, about 17 more were needed to meet the local public needs in the county.

Construction of that many pools and the attendant facilities would well run over 2.5 million dollars.

The survey further indicated by 1970 there would be a need for about 35 swimming pools to meet the growing needs of Lake County, Indiana, -- this at a time when Hammond's Lake Michigan beach is unusable due to poor water quality.

In addition, other beaches in the area are threatened with closure due to deterioration of water quality. Gary, Indiana's beach at Marquette Beach is presently suffering water quality problems according to the information received in connection with this Bureau's nationwide inventory of recreational areas.

In addition five beaches in Chicago's south side are threatened by the changing water quality. If the trend continues, millions of people within this area will be left without a place to swim on the southern end of this Great Lake.

Let's turn now to the Bureau of Sport Fisheries and Wildlife.

This Bureau is vitally interested in protecting and enhancing the quality of all waters throughout the nation.

In this respect, the Bureau is a signatory to a Memorandum of Understanding with the Department of Health, Education, and Walfare, concerning water pollution control.

This agreement was developed in recognition of common interests in the field of water pollution and to make possible a more effective program of interagency cooperation.

It is in accordance with the Fish and Wildlife Coordination Act of 1956 which authorized the Secretary of the Interior, through the Fish and Wildlife Service and the Bureau of Mines, to make such investigations as he deems necessary to determine the effects of domestic sewage, mine, petroleum, and industrial wastes, erosion silt, and other polluting substances on wildlife, and to make reports to the Congress concerning such investigations and of recommendations for alleviating dangerous and undesirable effects of such pollution.

Where the environment becomes changed or damaged by pollution, the fish population and fish-food organisms have to adjust to the altered conditions or perish. This produces fluctuations of abundance, changes in species composition, changes in growth rate, and many other modifications of the plant and animal life present.

Changes in the environment of the waters of Lake Michigan are being reflected in the following:

I. Lake trout and white fish have all but disappeared, in part due to lamprey infestations.

II. Alewives, a low value species, have greatly increased in numbers and catches of carp have also shown the increases. Periodic die-offs of alewives in great numbers at the southern end of Lake Michigan are a major nuisance.

III. Catch statistics of the Bureau of Commercial Fisheries indicate great declines in fish harvest.

IV. In 1963, about ten thousand migratory water fowl were killed along the shores of eastern and southern Lake Michigan -- loons, ducks, gulls.

Although the causes were not definitely determined, botulism, pesticides, organic pollutants were all investigated, obviously some highly unfavorable environmental change occurred.

Let's turn to the sister bureau.

The 1956 Act and a wide variety of other statutes enacted over the years authorize a broad range of activity by the Bureau of Commercial Fisheries.

The national fish policy established by the 1956 Act places high on the list of goals the responsibility for the economic betterment of the commercial fishing industry in all its phases -- production, processing, and distribution.

This responsibility extends to the control and prevention of pollution. Pollution is probably the primary factor today that limits the production of food fish and that threatens future fish production.

The measure of pollution as used here is the suitability of water for a required use. The Bureau of Commercial Fisheries is concerned with the suitability of the waters of Lake Michigan for production of fish and fish food organisms.

Where the environment becomes changed -- to those of you who are following the prepared presentation, I will go to page 12, -- where the environment becomes changed or restricted by pollution, the fish population and fish food organisms have to adjust themselves to altered conditions. This produces fluctuations of abundance, changes in species composition, changes in growth rate, and many other things, most of which do not benefit mankind.

This has been happening in the Great Lakes where the environment has been changed or rendered unfit by pollution.

The mighty Great Lakes with their many tributaries can rightfully be included among our nation's major natural resources. Through the years we have been led to believe that the Great Lakes can be little affected by the activities of man. Recent studies and observations show that many portions of the Great Lakes have been adversely affected by pollution. The severity of the pollution is evidenced by violent fluctuation in species composition, but not only fishes but also other aquatic organisms.

The choicer fishes are being replaced by less valuable species which have a greater tolerance for turbidity and low oxygen. The gradual accumulation of wastes day after day may render the water a barren wasteland to fish.

The Bureau is always interested in maintaining high water and environmental quality in areas where the development or continuation of commercial fisheries is possible. Conditions regarding water quality and fish production in the extreme southern portion of Lake Michigan have caused the Bureau concern in the past few years and particularly in the recent past. This problem is under study as part of our participation in the United States Public Health Service's Illinois River Basin-Great Lakes Project.

There has been a gradual disintegration of commercial fisheries in Illinois and Indiana that may be attributed to several things. A change in the fishery has resulted from predation from sea lampreys.

However, the general drop off in production from the areas involved implies that conditions other than sea lamprey predation has been at least partially responsible for poor conditions existing in the area in the Illinois and Indiana fisheries.

The Bureau is inclined to believe that water pollution has had an effect on the normal production of the finer fishes in that area, and approves and supports the foresight involved in the current approach to the problem existing in southern Lake Michigan.

Their attitude is stimulated particularly by the fact that, although gross pollution of the whole of Lake Michigan cannot be demonstrated at present, from a fishery standpoint, the gradual spread of situations resembling that extent in southern Michigan can become of vital concern in a relatively short time.

It is conceivable that the situation in southern Lake Michigan could spread subtly but steadily into other sections of this very large and productive body of water.

Statistics on the catch of fishes in the states of Indiana and Illinois indicate almost full collapse. Any movement made to restore the productive fishery that existed there prior to 1950 would certainly be of great value to the states involved and to the nation as a whole.

Let's turn now to the Bureau of Mines.

Adequate --

CHAIRMAN STEIN: Mr. Jordahl, I don't know if we may interrupt -- is Ted Layheu of the Department of East Chicago Sanitary District here?

MR. JORDAHL: Turning now to the Bureau of Mines.

Adequate supplies of usable water are essential to the mineral industry. As in many other industries, the quantity and quality of available water are vital factors in the development of an economic operation.

Consideration for the needs of the mineral industry must be included in a study of the nature being considered. Regulations on water discharges from a mineral-based operation must be consistent with good industry practices and must be based on factual evidence.

The Bureau of Mines has the scientific and technological abilities to assist in studies of the mineral industries with the objective of improving health conditions, increasing safety and efficiency and preventing economic waste.

This Bureau has just completed a canvas of the mineral industry to establish water use and water needs of the mineral industry. The study included development of data on the treatment methods in relation to quantity and quality of water, dishcarge from operating plants. These data will be useful in arriving at solutions to water problems which may arise in the mineral industry.

The Bureau of Mines can contribute to the study by identifying number and location of existing mineral-based industries and determining the water requirements, as well as the water discharges from these establishments.

Prediction of future water requirements of the mineral industry is also a province for the Bureau's special abilities to be utilized.

Assistant Secretary of Interior Carver, in a statement on July 8, 1963, stated the following relative to the role of the Bureau of Mines in the pollution-control field and I quote:

"Mineral-industry water interest initially conflict with all other major water interests. To ameliorate such conflicts, the Bureau of Mines of this Department encourages the mineral industry to practice water conservation, including water-quality control. In this way, we promote attainment of an equitable use balance within the total national demand for water. Water withdrawn from natural supplies must be used over and over where feasible. Waste water effluents must not be allowed to impair significantly the quality of our water supplies.

"Under the provisions of the Bureau of Mines

Organic Acts, it is both the province and the duty of the Secretary of the Interior to conduct economic inquiries and scientific and technicologic investigations among the mineral industries with the aim of improving health conditions, increasing safety and efficiency and preventing economic waste."

Let's turn now to another scientific organization within the Department, the Geological Survey.

This Bureau provides scientific information on the physical environment of water that is required for the successful development, use and control of water. All phases of the survey's work are designed to obtain timely and appropriate water facts needed for the solution of water problems.

Topographic quadrangle maps prepared by the survey give information on the surface features of river basins; its geologic maps give information on rock types and structure which control ground water currents and movement.

Hydrologic maps and reports based on the topographic and geologic data present information on the quantity, quality, and distribution of the water resources of the United States.

Programs and individual projects are designed cooperatively, and in some cases finances cooperatively with local state and government and other federal agencies; the survey has responsibility also for the design of the national network of hydrologic data collection.

Results of these projects are available to all in the form of maps and reports.

Now, the work of the Geological Survey and their cooperators in the area under study would include the Illinois water survey, Metropolitan Sanitary District of Greater Chicago, Indiana Board of Health, Indiana Department of Conservation, Division of Water Resources, Indiana Flood Control and Water Resources Commission, United States Public Health Service, Corps of Engineers, Illinois Division of Waterways and the Northeastern Illinois Metropolitan Area Planning Commission.

Let's turn now to the National Park Service. The National Park Service is very much interested in the improvement of the water quality of our streams, lakes, estuaries and oceans generally. The pollution of the southern end of Lake Michigan has a direct effect upon the recreation use potential of the Indiana Dune National Lake Shore proposal and an indirect effect upon all areas of the National Park system.

A recreation potential is lost in one area, be it on inland lakes, rivers, or ocean shoreline, whether the reason is development for other purposes or the pollution of the waters the result is a greater demand and heavier load on remaining facilities, local, state and national.

The present facilities in the vicinity of southern Lake Michigan are inadequate to meet the existing demand, to say nothing of the overwhelming future increases of recreation demand predicted by the ORRRC report.

Therefore, any action which can be taken to improve water quality in this area will be of immeasurable value to people deserving outdoor recreation.

In the way of conclusion, I would like to quote again from Mr. Carver who is now our Under Secretary and he stressed the essential element of cooperation as follows:

"In the early days of water resource conservation and development, there was little need for coordination among the various federal agencies involved. The field was so sparsely occupied, water problems - especially water-quality problems -- were so relatively less urgent than they are now, that coordination was less than a major consideration. Today, and in the years ahead, close and effective coordination is essential.

"This Department and other federal agencies must pool their resources in order to accomplish our goal of acceptable levels of water quality for our natural resources and our economic needs."

On behalf of the Department of the Interior and in line with this statement, we assure you that we will make every effort to assist on this study and to achieve a goal of acceptable water quality in the Waters of Lake Michigan.

Thank you, Mr. Chairman.

CHAIRMAN STEIN: Thank you, Mr. Jordahl.

Are there any comments or questions?

(No response)

Mr. Jordahl, you wanted your whole statement to appear in the record. Without objection, that will be done.

Are there any comments or questions?

(No response.)

STATEMENT BY HAROLD C. JORDAHL, JR., REGIONAL COORDINATOR
OFFICE OF THE SECRETARY
U. S. DEPARTMENT OF THE INTERIOR, MADISON, WISCONSIN
FOR PRESENTATION AT THE POLLUTION CONFERENCE
SOUTHERN LAKE MICHIGAN

March 3, 1965
Chicago, Illinois

INTRODUCTION

My name is Harold C. Jordahl, Jr., Regional Coordinator for the U.S. Department of the Interior.

The Department is pleased to offer its cooperation to the Public Health Service and the States of Illinois and Indiana in the matter of pollution at the southern end of Lake Michigan.

Secretary of the Interior Stuart Udall, in a statement before a subcommittee of the House Committee on Government operations early in 1963, expressed the Department of Interior's interest in maintenance of clean water as follows:

"....the focus of Interior effort is directed to the maintenance of adequate national water supplies and adequate water quality for whatever uses man may wish to make of this valuable resource. The Interior approach emphasizes the coordination and interrelation between uses and the effect of these uses on management and quality of the total water supply system.

"Maintenance of water quality involves not only the quality levels for human consumption, but also quality levels for consumption by other animal and plant life, for development of other natural resources, and for industrial processes. These quality considerations are interrelated. They can be understood and controlled best from the point of view of water as a resource, rather than from a point of view of a particular quality need."

The Department of the Interior has a rich background of experience and knowledge in this area and is equipped with highly qualified technical manpower. All bureaus and offices of the Department have an interest in water resources. In the Great Lakes, the Bureaus of Outdoor Recreation, Commercial Fisheries, Sport Fisheries and Wildlife, Mines, Geological Survey and National Park Service have a direct interest.

BUREAU OF OUTDOOR RECREATION

The nine upper midwest states which make up Mid-America contain 50 million people. Much of this nine-state region is flat or gently rolling prairie, plain, and field, and has a relative scarcity of water and topographic resources for recreation purposes, but many fine highways provide ready access to all points of the compass. Mid-Americans making plans for vacations and outdoor recreation look to the Ozarks in the southwest, to the Smoky Mountains in the southeast, or to this Great Lakes region to the north.

The highway pattern in Mid-America indicates that the Great Lakes are within easy reach of these 50 million people. And, situated at the doorstep of the southern end of Lake Michigan is the gigantic Chicago metropolitan area.

The Outdoor Recreation Resource Review Commission in their voluminous studies highlighted the importance of water to outdoor recreation as follows:

"Water is a focal point of outdoor recreation. Most people seeking outdoor recreation want water -- to sit by, to swim and to fish in, to ski across, to dive under and to run their boats over. Swimming is now one of the most popular outdoor activities and is likely to be the most popular of all by the turn of the century. Boating and fishing are among the top ten activities. Camping, picnicking and hiking, also high on the list, are more attractive near water sites. About 90 percent of all Americans participated in some form of outdoor recreation in 1960 -- a total of 4.4 billion occasions. By 1976, the total will be 6.9 billion, and by the year 2000, it will be 12.4 billion -- a three-fold increase by the turn of the century."

The Bureau of Outdoor Recreation was established by Act of Congress on May 28, 1963 as a result of recommendations made by the Outdoor Recreation Resources Review Commission, to provide a focal point in the Government for the Nation's outdoor recreation activities. The Congress took this action because they deemed it desirable that (1) all American people of present and future generations be assured adequate outdoor recreation resources, and (2) prompt and coordinated efforts be made toward conserving, developing and utilizing such resources for the benefit and enjoyment of the American people. Thus, it has become the purpose of this Bureau to fulfill these desires of the Congress. As a result this Bureau shares a very deep concern for events which have been and are taking place in the area under consideration here, events which have affected the natural resources of this region and their usefulness to the American people, particularly the local citizen, for recreational pursuits.

The area under consideration includes much of the Chicago-Northwestern Indiana Standard Consolidated area as defined by the U. S. Census. It had a 1960 population of about 6.8 million, an increase of 21.6 percent over the 1950 population. As such, it is an area of rapidly increasing recreational needs where, at the same time, areas suitable for recreation development must compete with industrial and other development.

As urbanization increases, the need for natural areas in which urban people may retreat occasionally from the complexity of city life increases. Such an escape is almost a spiritual necessity.

It has been established through studies by the Outdoor Recreation Resources Review Committee that our greatest need is for outdoor recreational areas near population centers. ORRRC studies further indicate 90 percent of all Americans participate annually in some type of outdoor recreation, with 44 percent preferring water-oriented recreation, mainly swimming. This region, with its near seven million local inhabitants, adjoins Lake Michigan, one of the largest bodies of fresh water in the world. The lake is a real treasure for those able to use it for outdoor recreational activities. However the pleasure of swimming in its cooling waters or sunbathing along one of its pleasant sand beaches after a sweltering day at work is not available to many of the thousands who live along its shores.

For example, Hammond, Indiana, with its 112,000 population, has about a quarter mile of public beach. Such a beach by accepted standards should support a daily attendance of 2,000 to 3,000 people, affording thousands of local people the opportunity to enjoy conveniently water-oriented outdoor recreation throughout the summer. Such is not the case, however, the beach has been closed for more than 15 years by order of the local Board of Health, because the quality of the water makes it unsafe for swimming. Official beach attendance is zero. Thus, it is estimated 150-250 thousand activity days of swimming are lost annually due to the closure of this beach. A portion of the local water-oriented recreation needs of the area are met in the form of swimming pools. A recent Indiana Department of Health survey indicates that while Lake County had 9 outdoor pools in 1960, about 17 more were needed to meet local public needs within the county. Construction of that many pools and their attendant facilities could well run over 2.5 million dollars. The survey further indicated by 1970 there would be a need for about 35 swimming pools to meet the growing needs of Lake County, Indiana -- this at a time when Hammond's Lake Michigan beach sits unusable due to poor water quality.

In addition, other beaches in the area are threatened with closure due to deterioration of water quality. Gary, Indiana's beach at Marquette Park, is presently suffering water quality problems according to information received in connection with this Bureau's Nationwide inventory of recreation areas. In addition, five beaches on Chicago's south side are threatened by the changing water quality. If the trend continues, millions of people within this area will be left without a place to swim on the southern end of this Great Lake.

BUREAU OF SPORT FISHERIES AND WILDLIFE

The Bureau of Sport Fisheries and Wildlife is vitally interested in protecting and enhancing the quality of all waters throughout the Nation. In this respect, the Bureau is a signatory to a Memorandum of Understanding with the Department of Health, Education, and Welfare concerning water pollution control. This agreement was developed in recognition of common interests in the field of water pollution and to make possible a more effective program of interagency cooperation.

It is in accordance with the Fish and Wildlife Coordination Act of 1956 which authorized the Secretary of the Interior, through the Fish and Wildlife Service and the Bureau of Mines, to make such investigations as he deems necessary to determine the effects of domestic sewage, mine, petroleum, and industrial wastes, erosion silt, and other polluting substances on wildlife, and to make reports to the Congress concerning such investigations and of recommendations for alleviating dangerous and undesirable effects of such pollution. These investigations shall include: (1) the determination of standards of water quality for the maintenance of wildlife; (2) the study of methods of abating and preventing pollution, and (3) the collection and distribution of data on the progress and results of such investigations for the use of Federal, State, municipal and private agencies, individual organizations or enterprises.

Where the environment becomes changed or damaged by pollution, the fish population and fish-food organisms have to adjust to the altered conditions or perish. This produces fluctuations of abundance, changes in species composition, changes in growth rate, and many other modifications of the plant and animal life present.

Changes in the environment of the waters of Lake Michigan are being reflected in the following:

1. Lake trout and Whitefish have all but disappeared, in part due to lamprey infestations.

2. Alewives, a low value species, have greatly increased in numbers, and catches of carp have also shown great increases. Periodic die-offs of alewives in great numbers at the southern end of Lake Michigan are a major nuisance.

3. Catch statistics of the Bureau of Commercial Fisheries indicate great declines in fish harvest.

4. In 1963 about 10,000 migratory waterfowl were killed along the shores of eastern and southern Lake Michigan (loons, ducks, gulls). Although the causes were not definitely determined, (botulism, pesticides, organic pollutants were all investigated), obviously some highly unfavorable environmental change occurred.

BUREAU OF COMMERCIAL FISHERIES

The 1956 Act and a wide variety of other statutes enacted over the years authorize a broad range of activity by the Bureau of Commercial Fisheries. The National fish policy established by the 1956 Act places high on the list of goals the responsibility for the economic betterment of the commercial fishing industry in all its phases - production, processing and distribution. This responsibility extends to the control and prevention of pollution. Pollution is probably the primary factor today that limits the production of food fish and in fact threatens future fish production. The measure of pollution as used here is the suitability of water for a required use. The Bureau of Commercial Fisheries is concerned with the suitability of the waters of Lake Michigan for production of fish and fish food organisms.

The fishermen of America have played a unique part in this country's economy since its founding. Fisheries are still of major importance to many sections of the country. Employment, direct and indirect, is furnished to 500,000 citizens. Today our fisheries supply over five billion pounds of fish each year, about half of which is used for human food. The fish catch, when processed, is worth over a billion dollars annually at the retail level.

Our aquatic resources are far more valuable than is indicated by the number of persons they support or the dollar values of their products.

1. They are living, renewable resources which can continue to make their contribution to our welfare forever if we treat them wisely.

2. They enrich our diet with variety.

3. They promote our health, providing dietary supplements such as vitamins, trace minerals, and the essential requirements in wider variety than any other class of foods.

4. They have, because of the unique properties of their proteins and oils, potential uses as pharmaceuticals and industrial chemicals.

5. They supply to our animal industries vital proteins, fats and growth factors.

6. They develop the seafaring qualities of our people and provide marine facilities and equipment sorely needed by an America now faced with transoceanic problems and wide responsibilities in a changing world.

The Fish and Wildlife Act of 1956 recognizes that fish and shellfish are capable of making a valuable continuous contribution to the national economy, food supply and health, recreation, and well-being of our citizens. When these resources are properly protected, properly developed, properly managed, and properly utilized, the Act considers them capable of being greatly increased. Control of pollution is one conservation measure that must be practiced. The alternative is destruction by neglect.

It is the National Fish Policy to:

1. Increase and maintain forever, for the people of the United States, a fishery resource capable of yielding the maximum annual product.

2. Strengthen and maintain a vigorous fishery industry by assuring full and fair access to the American market.

3. Do these things in partnership with the States and in full accordance with our international obligations, and without sacrificing the system of free enterprise.

In pursuing these policies the Federal Government has a responsibility to the Public as a whole to see that our fishery resources are utilized to the fullest economic extent without damage to their future productivity.

A deeper look into the complex problems facing our fishing industry today is a look into the major trends operating over decades, that have produced the critical problems now facing us.

Our population growth, the change from rural to urban economy, and industrial development have caused increasing complications: first, from domestic wastes; then from dams, industrial wastes, channel and harbor improvements, marsh drainage and conversion of marshlands and backwaters to residential and industrial sites; more recently from the widespread and rapidly expanding use of insecticides, herbicides, detergents, and a host of other technological developments; and now the possible dangers introduced by disposal of radioactive wastes from research, industry and other uses.

Our raw material, the fishes, and the organisms upon which they depend for food consist of the living resources in rivers, lakes and the sea. They are the property of no man until caught. In life they are the concern of the people and can be conserved and managed by governmental authority -- local, State, Federal or international. Hidden as they are beneath the surface of the water, special and complicated techniques are needed to find out how they can be managed so as to yield maximum sustained production.

Sound management requires an understanding of the nature of living resources. The stocks of fish which support our fisheries are self-renewing. They do not exist in limited quantities, like our mineral resources, to be used once and thereafter be gone forever. Living resources can endure forever, and therefore are more valuable, by far, than the annual yield would suggest. This is true only if we manage them wisely, and we can do this only if we understand the habits of the aquatic animals and plants and their interrelationships with each other and with the environment.

Where the environment becomes changed or restricted by pollution, the fish population and fish food organisms have to adjust themselves to altered conditions. This produces fluctuation of abundance, changes in species composition, changes in growth rate and many other things, most of which do not benefit mankind. This has happened in the Great Lakes where the environment has been changed or rendered unfit by pollution.

The mighty Great Lakes with their many tributaries can rightfully be included among our nation's major natural resources. Through the years we have been led to believe that the Great Lakes can be little affected by the activities of man. Recent studies and observations show that many portions of the Great Lakes have been adversely affected by pollution. The severity of the pollution is evidenced by violent fluctuations in species composition by not only fishes but other aquatic organisms. The choicer fishes are being replaced by less valuable species which have a greater tolerance for turbidity and low oxygen. The gradual accumulation of wastes day after day may render the water a barren wasteland to fish.

Most important to fishery utilization is the capacity of a fish population to restore iself after its numbers have been reduced or changed. For this reason all is not lost. By cleaning up pollution, the restoration of our fishery resources can become a reality. Once again we will be able to see, capture and eat the choicer varieties of fish which are no longer present or are present in limited numbers.

The Bureau of Commercial Fisheries is always interested in maintaining high water and environmental quality in areas where the development or continuation of commercial fisheries is possible. Conditions regarding water quality and fish production in the extreme southern portion of Lake

Michigan have caused the Bureau concern in the past few years and particularly in the recent past. This problem is under study as part of our participation in the U. S. Public Health Service's Illinois River Basin-Great Lakes Project.

There has been a gradual disintegration of commercial fisheries in Illinois and Indiana that may be attributed to several things. A change in the fishery has resulted from predation from sea lampreys. However, the general drop-off in production from the areas involved implies that conditions other than sea lamprey predation have been at least partially responsible for poor conditions existing in the Illinois and Indiana commercial fisheries. The bureau is inclined to believe that water pollution has had an effect on the normal production of the finer fishes in that area, and approves and supports the foresight involved in the current approach to the problem existing in southern Lake Michigan.

The Bureau's attitude is stimulated particularly by the fact that although gross pollution of the whole of Lake Michigan cannot be demonstrated at present, from a fishery standpoint, the gradual spread of situations resembling that extent in southern Lake Michigan can become of vital concern in a relatively short time. It is conceivable that the situation in southern Lake Michigan could spread subtly but steadily to other sections of this very large and productive body of water. The Bureau is interested in any steps that can be taken to inhibit or prevent the spread of such conditions and urges that action be taken to bring about the improvement of waters affected. Statistics on the catch of fishes in the states of Indiana and Illinois indicate almost full collapse. Any moves made to restore the productive fishery that existed there prior to 1950 would certainly be of great value to the states involved and to the nation as a whole.

BUREAU OF MINES

Adequate supplies of useable water are essential to the mineral industry. As in many other industries, the quantity and quality of available water are vital factors in the development of an economic operation. Consideration for the needs of the mineral industry must be included in a study of the nature being considered. Regulations on water discharges from a mineral-based operation must be consistent with good industry practices and must be based on factual evidence. The Bureau of Mines has the scientific and technological abilities to assist in studies of the mineral industries with the objective of improving health conditions, increasing safety and efficiency and preventing economic waste.

The Bureau has just completed a canvass of the mineral industry to establish water use and water needs of the mineral industry. The study included development of data on the treatment methods in relation to quantity and quality of water dishcarged from operating plants. These data will be useful in arriving at solutions to water problems which may arise in the mineral industry.

The Bureau of Mines can contribute to the study by identifying number and location of existing mineral-based industries and determining the water requirements, as well as the water discharged, from these establishments. Prediction of future water requirements of the mineral industry is also a province where the Bureau's special abilities can be utilized.

Assistant Secretary of Interior Carver, in a statement on July 8, 1963, stated the following relative to the role of the Bureau of Mines in the pollution-control field.

"Mineral-industry water interests initially conflict with all other major water interests. To ameliorate such conflicts, the Bureau of Mines of this Department encourages the mineral industries to practice water conservation, including water-quality control. In this way, we promote attainment of an equitable use balance within the total national demand for water. Water withdrawn from natural supplies must be used over and over where feasible. Waste water effluents must not be allowed to impair significantly the quality of our water supplies.

"Under the provisions of the Bureau of Mines Organic Act, it is both the province and the duty of the Secretary of the Interior to conduct economic inquires and scientific and technological investigations among the mineral industries with the aim of improving health conditions, increasing safety and efficiency, and preventing economic waste ..... Close contact with current industrial practices is maintained through activities that include: (1) conduct of cooperative studies with State and other governmental agencies and with industry; (2) participation in the committee work of technical societies; and, (3) informal exchanges of information between Bureau and industrial specialists in appropriate fields."

GEOLOGICAL SURVEY

The Geological Survey provides scientific information on the physical environment of water that is required for the successful development, use, and control of water. All phases of the Survey's work are designed to obtain timely and appropriate water facts needed for the solution of water problems. Topographic quadrangle maps prepared by the Survey give information on the surface features of river basins; its geologic maps give information on rock types and structure which control ground water occurrence and movement. Hydrologic maps and reports based on these topographic and geologic data present information on the quantity, quality and distribution of the water resources of the United States.

Programs and individual projects are designed cooperatively, and in some cases financed cooperatively, with State and local governments and other Federal agencies; the Survey has responsibility also for the design of the national network of hydrologic data collection. Results of these projects are available to all in the form of maps and reports. The Geological Survey wishes to continue its cooperation with Federal and State agencies in the basins around Lake Michigan to obtain the information on water and its environment that is most needed in the solution of the pressing water problems. These agencies and those to which data and information have been furnished include Illinois Water Survey, Metropolitan Sanitary District of Greater Chicago, Indiana Board of Health, Indiana Department of Conservation, Division of Water Resources, Indiana Flood Control and Water Resources Commission, U. S. Public Health Service, Corps of Engineers, Illinois Division of Waterways, and the Northeastern Illinois Metropolitan Area Planning Commission.

NATIONAL PARK SERVICE

The National Park Service is very much interested in the improvement of the water quality of our streams, lakes, estuaries and oceans generally. The pollution of the southern end of Lake Michigan has a direct effect upon the recreation use potential of the Indiana Dunes National Lakeshore proposal and an indirect effect on all areas of the National Park Systems. A recreation potential is lost in one area, be it on inland lakes, rivers, or ocean shoreline -- whether the reason is development for other purposes or the pollution of the waters -- the result is a greater demand and heavier load on remaining facilities, local, State, and National.

The present facilities in the vicinity of southern Lake Michigan are inadequate to meet the existing demand, to say nothing of the overwhelming future increases of recreation demand predicted by the ORRRC report. Therefore, any action which can be taken to improve water quality in this area will be of immeasurable value to people deserving outdoor recreation.

CONCLUSION

Mr. Carver, in the statement previously noted, stressed the essential element of cooperation as follows:

"In the early days of water resources conservation and development, there was little need for coordination among the various Federal agencies involved. The field was so sparsely occupied, water problems -- especially water-quality problems -- were so relatively less urgent than they are now, that coordination was not then a major consideration. Today, and in the years ahead, close and effective coordination is essential. This Department and other Federal agencies must pool their resources in order to accomplish our goal of acceptable levels of water quality for our natural resources and our economic needs."

CHAIRMAN STEIN: Thank you very much, Mr. Jordahl.

This, I think, completes the federal agency presentation.

The Department of Interior and the Corps of Engineers, as you know, work very closely with us in the water resources field.

There is one other agency, water resources agency in the Department of Agriculture.

They didn't indicate they wanted to speak here at this meeting, and I guess, flying in here, you can guess why.

That concludes it?

MR. POSTON: That concludes it.

CHAIRMAN STEIN: Again, we would like to call on Mr. Klassen of Illinois.

Mr. Klassen.

MR. KLASSEN: Before I call on the next agency to appear, Mr. Chairman, last evening, after the session it was called to my attention that I made a technically incorrect statement and I, just for the record, wanted to correct it.

I did say that two-tenths parts per million of cyanide was toxic.

This is technically incorrect. I should have said that two-tenths parts per million of cyanide is the maximum amount permissive in drinking water.

Apparently there is a sensitivity about cyanide in certain quarters and I -- my only conclusion is, I hope this sensitivity continues.

(Laughter)

Without minimizing any of the multipurpose uses of Lake Michigan under consideration here, there is one that is the most important without any question.

That is the source of Lake Michigan as a public water supply for human consumption.

A water supply has some peculiar characteristics. It is a peculiar type of industry. It has no control over its raw material and this is something that industry would never tolerate.

Yet, it is expected and required to turn out a quality product, a product that must be safe to drink, every drop of it, every minute of every day, of every night.

Again, it is an industry that has to take what's given to it. There is no industry, I am sure, and those particularly represented in this conference, that would think of not controlling its raw materials.

Yet, we have seen that some of these industries and cities think nothing of effecting the raw material of such an important commodity as a water supply.

The fact that Chicago's water supply is safe to drink, I know and I am in a position to know, is due to the competency and dedication of the people that are in charge of the Chicago water supply. I see, I know this over the years and they have had a number of problems and it might strike some of you here as rather a peculiar set of circumstances in this country where very rarely can the officials in responsible charge of a public water supply get up publicly and tell the public what their problems are.

Usually, they have had to take what's given to them and solve the problem the best way they can. And, this is no exception here.

Without in any way minimizing any of the other jobs in the city, I know this from my long years of experience, that the people in charge of a public water supply, whether it is Chicago or any other place, has the one most responsible job in any municipality because literally, and figuratively, in their hands rests the health and the lives of the people of that community, in this instance, the health and lives of over five and one-half million people, where a billion and a half gallons of water every day, at peak days particularly, roughly about a billion gallons is pumped to the citizens of this area.

I say, it is a rather rare opportunity that waterworks officials have of laying out their particular problems. This is going to be one of the exceptions because this is a fact-finding conference, and the person that is going to lead off for the City of Chicago is the man that has been and is responsible for this activity in the City, the Commissioner of Water and Sewers, James Jardine.

CHAIRMAN STEIN: While Mr. Jardine is coming up, I think we have a little advance information. A good deal of his presentation will be based on slides and I think this will probably be one of the most vital or interesting we have. The suggestion is that some of the people sitting in the fringes back there who don't have a good view of the screen might want to adjust their seats and make sure they see the slides.

MR. JAMES W. JARDINE: Mr. Chairman, Distinguished Conferees, Ladies and Gentlemen:

I have submitted to the reporter the full text of my statement, Mr. Chairman, and in the interest of saving time, I would appreciate it if the full statement could be included in the record and I will brief the reporter later.

CHAIRMAN STEIN: Without objection, this will be done.

MR. JARDINE: I might add that those who follow me will present the slides.

I am appreciative of the opportunity to be here today as a representative of the Chicago Water Works System which provides water service to over 4,500,000 persons in Chicago and some 63 suburban communities in an area of over 400 square miles.

The need, the urgency and the importance of this conference, and the far reaching effect it will have on the health and welfare of millions of people is indicated by the fact that it was called by the Honorable Anthony J. Celebrezze, Secretary of the Department of Health, Education, and Welfare as a result of the very excellent survey and report made by the United States Public Health Service.

The history of Chicago is a saga of a determined people's efforts to control the use of the most important single physical and natural asset associated with Chicago - fresh water. In this apparently never ending struggle to retain the full use of Lake Michigan's waters to support the domestic, commercial, industrial, and recreational needs of Chigagoland's residents, the Chicago Water Department, in conjunction with the Metropolitan Sanitary District, have sought and received cooperation from both Federal and state agencies through the years.

During the one hundred and thirty-two year history of Chicago, as a community, numerous battles have been fought against the threat and scourge of water pollution and the various waterborne diseases which it produces.

Because of Chicago's strategic location along the shores of Lake Michigan, the lake has served to influence the City's development as the Nation's transportation center and the heart of the midwest's agricultural and industrial complex.

However, if the Chicago area and the neighboring state of Indiana are to continue to reap the many benefits of their close dependence upon the Lake, an immediate, effective, and well coordinated action program must be undertaken. This program must have as its objectives the permanent abatement of the present pollution problem so clearly defined in the United States Public Health Service's report, as well as the prevention of further lake pollution from all sources.

The protection of our source of water supply is vital for maintaining the prosperity, health and welfare of the large metropolitan area supplied from the Chicago Water Works System.

Throughout the years, the Chicago Water Department has managed to keep the City's water supply safe by introducing a series of water treatment improvements which were incorporated into the design of a vast water filtration program.

The South District Filtration Plant was placed into partial operation in 1945 and into full operation in 1947. The giant Central District Filtration Plant, with a nominal capacity of 960 million gallons per day, was placed in operation in 1964, providing the entire city of Chicago and sixty-three suburban municipalities with a filtered water supply.

In its fight against the effects of Lake pollution, the Chicago Water Department operates and maintains a comprehensive system of collection, treatment, and distribution facilities designed to serve Chicago and its suburban neighbors, with a product as pure and safe as modern technology permits.

The people of Chicago have spent hundreds of millions of dollars to protect their drinking water and to prevent water pollution. Chicago is proud of its leading role in the development of many of the most important techniques now in use in water treatment.

The present system is a product of a comprehensive plan and program which, when completed this year, will enable us to supply the projected water needs of 1980, many years before they occur.

This vast system consists of the world's two largest water filtration plants with a designed capacity of approximately 1.5 billion gallons a day and a peak capability exceeding 2.5 billion gallons a day.

The distribution systems consist of some 75 miles of water tunnels beneath the lake and a network of over 4,000 miles of water mains fed by 11 water pumping stations.

This system supplies the water needs of over 4,500,000 persons residing in the city of Chicago and sixty-three suburbs. Daily water pumpage exceeds 1,046,000,000 gallons. The cost of the complete system is in excess of 460 million dollars; however, replacement cost would probably exceed one billion dollars.

Thus, it is apparent that Chicago has spared no expense in its efforts to provide a plentiful supply of safe and palatable water for its users.

The problems we currently face with the degradation of the lower or southern reaches of Lake Michigan are real and dangerous.

The rapidly expanding population and industrial complex in the Calumet area of Indiana have been the principal source of pollution of the southern end of Lake Michigan.

The crib and shore water intakes of the South Filtration Plant are/ at times exposed to excessive pollution from industrial and sewage wastes discharged into the lake from the Calumet Region.

However, we have been able to produce a high quality, safe palatable water at all times, but our experience in the last several years has indicated that periods of pollution are of greater frequency and of progressively increasing intensity.

While the rising cost of water purification is of interest to us, our primary concern remains with the quality of the conventional water treatment processes to produce a satisfactory quality water in the future if the trend of increasing pollution persists.

While some progress has been made in the Calumet area in the treatment of waste by industry, the constant increase in industrial production capacities and changes in industrial processes used, and the fact that waste treatment has not kept pace with this increase, has caused what we believe a serious water pollution problem which requires immediate bold and drastic measures to abate.

We believe the solution adopted should have as its final objective the complete and permanent protection of Lake Michigan from man-made pollution. We also believe that the people who look to the lake for beauty, livelihood, recreation and most important, a healthy existence, share this view and will support whatever program will accomplish these goals.

We have found from past experience that most of the parties involved with this problem will cooperate willingly. What is urgently needed is a program which all can support now and in the future. With the technical aid and guidance available from the Department of Health, Education, and Welfare and more particularly the United States Public Health Service, we believe such a program can and will be adopted.

However, it is imperative to keep in mind that time is the one commodity we don't have in ample supply; technical data, resources, leadership, and desire are abundant. Having expended funds approximating a billion dollars in previous efforts to eradicate the problem, Chicago is again willing to accept the challenge.

We intend to take whatever steps necessary to prevent continued degradation of the quality of Lake Michigan water. We hope to do this forcefully and intelligently.

Without question, the need for drastic corrective action is of the greatest urgency. We urge all of the participants of this conference to pledge their effort to restore Lake Michigan to a quality level where all of the many millions of residents and tourists can share in the use of one of nature's most beautiful, functional, and valuable resources.

This is not merely something that should be done, it is something that must be done.

STATEMENT PRESENTED BY JAMES W. JARDINE, COMMISSIONER
DEPARTMENT OF WATER AND SEWERS, CITY OF CHICAGO
AT THE INTERSTATE POLLUTION CONFERENCE
HELD ON MARCH 2, 1965

Mr. Chairman, Distinguished Conferees, Ladies and Gentlemen:

I am very appreciative of the opportunity to be here today as a representative of the Chicago Water Works System which provides water service to over 4,500,000 persons in Chicago and some sixty-three suburban communities in an area of over 400 square miles.

The need, the urgency and the importance of this conference, and the far-reaching effect it will have on the health and welfare of millions of people is indicated by the fact that it was called by the Honorable Anthony J. Celebrezze, Secretary of the Department of Health, Education and Welfare as a result of the very excellent survey and report made by the United States Public Health Service.

The history of Chicago is a saga of a determined people's efforts to control the use of the most important single physical and natural asset associated with Chicago - fresh water. In this apparently never-ending struggle to retain the full use of Lake Michigan's waters to support the domestic, commercial, industrial, and recreational needs of Chicagoland's residents, the Chicago Water Department, in conjunction with the Metropolitan Sanitary District, have sought and received cooperation from both federal and state agencies through the years.

During the 132 year history of Chicago, as a community, numerous battles have been fought against the threat and scourge of water pollution and the various waterborne diseases which it produces.

Because of Chicago's strategic location along the shores of Lake Michigan, the lake has served to influence the city's development as the nation's transportation center and the heart of midwest's agricultural and industrial complex.

However, if the Chicago area and the neighboring state of Indiana are to continue to reap the many benefits' of their close dependence upon the lake, an immediate, effective, and well coordinated action program must be undertaken. This program must have as its objectives the permanent abatement of the present pollution problem so clearly defined in the United States Public Health Service report, as well as the prevention of further lake pollution from all sources.

The protection of our source of water supply is vital for maintaining the prosperity, health and welfare of the citizens of our city, as well as the lake water users in the large metropolitan area supplied from the Chicago Water Works System.

Chicago became an incorporated community in 1833 and a city in 1837. At that time, the Chicago River was used as a means of collecting and removing the sanitary wastes produced by the community's 4,000 residents. Drinking water was obtained from shallow wells or directly from the lake. In this way, the deadly cycle of sanitary wastes contaminating the community's water supply was activated with resultant disease-breeding potential.

When the infant city formed its own water company, the forerunner of the Department of Water and Sewers, it assumed a primary responsibility for protecting the public health from water-borne disease, a charge which remains in effect today.

Early efforts to obtain an uncontaminated source of water prompted the city's engineers to reach for clean water by extending water intakes further into the lake, beyond the polluted shore lines. The first such effort occurred in 1854, when a water intake was extended 600 feet into the lake. However, in the same year a cholera epidemic claimed the lives of 5.5 percent of the population. Mute testimony to the magnitude of the problem.

In 1856, work began on the construction of an integrated sewerage system, the first of its kind in the United States. With the completion of this project, the surface drainage of Chicago's flat and marshy areas was greatly improved but only at the expense of the problem of supplying safe drinking water. This was particularly true since the integrated sewerage system emptied into the Chicago River which in turn flowed into the lake.

During this period, the problems of supplying an adequate supply of uncontaminated drinking water were ever compounding because of the rapidly increasing population.

In 1862, the City's Chief Engineer, Mr. Chesbrough, was sounding the alarm about the increasing pollution of the river and rapidly declining quality of the water supply.

About this time, a program was formulated to attack the problem on two fronts in an attempt to break the chain linking the water supply problem with that of sewage disposal.

In the quest for safe water, a tunnel system under the lake bed was constructed, connecting water intakes located two miles from shore. The first such water tunnel was completed in 1867 and attracted world-wide interest.

At the same time, it was determined that steps would have to be taken to prevent the flow of the river with its pollution load from reaching the lake.

Thus, the plan to reverse the flow of the Chicago River had its beginning. City engineers calculated that, if the Illinois and Michigan Canal, opened in 1848, were deepened, the flow of the Chicago River from West to East would be reversed.

This project was started in 1865 and completed in 1871. The system worked well for a time, but expanding population and real estate development created a situation which finally terminated the temporary relief and resulted in the Chicago River returning to its normal flow. Other unsuccessful schemes followed.

Finally, on August 2, 1885, nature counter-attacked with a torrential rainstorm which blanketed the Chicago area with over 6 inches of rainfall. The intensity of the storm scoured the sewerage system and produced a record mass of pollution.

The storm waters also overloaded the river and canal system permitting the storm pollution to enter the lake where it spread beyond the water intakes. This episode triggered an epidemnic of typhoid fever which persisted for several years.

This crisis also led to the formation by the Chicago City Council of a Drainage and Water Supply Commission in 1886. This Commission was given the assignment of studying the city's problems relating to water supply, sewage disposal, and storm drainage. After several years of study, the Commission recommended a plan designed to protect Chicago's most priceless asset - its lake front and water supply.

The plan was to:

1. Relocate the flow of the Des Plaines River to the westerly edge of its drainage basin.
2. Construct a new drainage canal 28 miles in length from the Chicago River at Damen Avenue to the Des Plaines River at Lockport. This would permanently reverse the flow of the Chicago River.
3. Build major intercepting sewers along the lake to collect existing sewerage and drain this sewerage to the new canal.

To carry out these plans, the Commission recommended the creation of the Metropolitan Sanitary District. Enabling state legislation was passed in 1889 and on January 18, 1890, the Metropolitan Sanitary District became a reality.

Up to this time, the city of Chicago government had shouldered responsibility for water supply and sewage disposal. Now a new and separate governmental agency was created to protect Lake Michigan from pollution. The success of the Metropolitan Sanitary District, covered in a separate report, in carrying out this assignment and manner in which this task was accomplished is both history and one of the Seven Engineering Wonders.

While the Sanitary District attacked their phase of the problem, the protection of Lake Michigan from pollution, the Chicago Water Department concerned itself with its mission of supplying an adequate quantity of safe water of high quality.

In support of this objective, the Water Department introduced the sterilization treatment of the raw water with a hypochlorite solution in 1912.

By 1915, all of the city's water was receiving this chemical treatment. Shortly thereafter, liquid chlorine feeding equipment was installed in all of the water pumping stations. The striking effect of these improvements was immediately noted as the annual death rate from typhoid fever was sharply reduced to a rate of 2 per 100,000 in 1917, from the high of 174 per 100,000 in 1891. Reduction in the frequency of cholera and dysentery also followed the use of chemical treatment.

In 1923-4, 228 typhoid fever cases occurred on the city's south side and 23 persons died as a result. City officials immediately recognized the need for a more rigid system of chlorination control.

New chlorination equipment was installed in duplicate sets at all of the pumping stations. Permanent chlorine attendants were employed and trained, and a comprehensive program of water sampling, testing and pollution study was instituted under technical supervision. These actions proved their effectiveness by virtually eliminating death by typhoid fever in Chicago.

In fact, since 1924, there hasn't been recorded in Chicago a single case of typhoid attributed to the public water supply. Intensive lake pollution surveys were made in 1924-25 by the United States Public Health Service and in 1925 and 1926 by the City. These surveys and reports warned of declining water quality and growing pollution in the Calumet Region. The Chicago Water Department heeded the warning by beginning construction in 1926 of an experimental filtration plant to conduct research for design of a full scale plant.

Beginning in 1927, the city's water supply began suffering periods of severe chlorophenol tastes and odors. A pollution abatement program was immediately launched by certain industrial concerns in cooperation with the city of Chicago, the Indiana State Board of Health, and the Metropolitan Sanitary District.

Numerous conferences were held for several years and by 1931 the abatement program had significantly reduced the amount of phenol pollution in the lake. Relief was temporary, however, and the water quality at the intakes again showed an increasing pollution trend with "oil refinery" type tastes and odors predominating, although chlorophenol taste persisted.

The increasing deterioration of raw water quality on the city's south side prompted the Department to install an ammonia-chlorine treatment plant at the Dunne Crib in 1936. This type treatment was installed to reduce taste and odor problems and to provide additional protection. The water filtration program, which had begun at the experimental plant, was now accelerated very rapidly and construction of the 320 million gallon per day South District Filtration Plant was started in 1938.

The Dunne Crib water supply continued to deteriorate from 1937 through 1941. At the city's request, the United States Public Health Service studied the situation in 1941-42 and reported again that the Calumet Region was again responsible for increasing levels of lake pollution.

Following this report, the State of Illinois in 1943 brought suit in the United States Supreme Court against several northern Indiana cities and industrial concerns in an effort to reduce lake pollution. In 1944, the Chicago Water Department along with the Metropolitan Sanitary District, and other Chicago agencies made a joint survey in the Calumet Region and documented many domestic sewage and industrial waste outlets.

Throughout the years, the Chicago Water Department has managed to keep the city's water supply safe by introducing a series of water treatment improvements which were incorporated into the design of a vast water filtration program. Chlorination equipment capacity was increased at the pumping stations, twenty-four hour chlorination control stations were installed in the City's North and Central water districts, and an intensive water quality surveillance program was initiated with checkpoints in the lake as well as the Calumet River system.

The South District Filtration Plant was placed into partial operation in 1945 and into full operation in 1947. The giant Central District Filtration Plant, with a nominal capacity of 960 million gallons per day, was placed in operation in 1964 providing the entire city of Chicago and sixty-three suburban municipalities with a filtered water supply.

In its fight against the effects of lake pollution, the Chicago Water Department operates and maintains a comprehensive system of collection, treatment, and distribution facilities designed to serve Chicago and its suburban neighbors with a product as pure and safe as modern technology permits.

The people of Chicago have spent hundreds of millions of dollars to protect their drinking water and to prevent water pollution. Chicago is proud of its leading role in the development of many of the most important techniques now in use in water treatment.

The present system is a product of a comprehensive plan and program which when completed this year will enable us to supply the projected water needs of 1980, many years before they occur.

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We believe the solution adopted should have as its final objective the complete and permanent protection of Lake Michigan from man-made pollution. We also believe that the people who look to the lake for beauty, livelihood, recreation, and most important, a healthy existence, share this view and will support whatever program will accomplish these goals.

We have found from past experience that most of the parties involved with this problem will cooperate willingly. What is urgently needed is a program which all can support now and in the future.

With the technical aid and guidance available from the Department of Health, Education, and Welfare and, more particularly, the United States Public Health Service, we believe such a program can and will be adopted.

However, it is imperative to keep in mind that time is the one commodity we don't have in ample supply; technical data, resources, leadership, and desire are abundant.

Having expended funds approximating a billion dollars in previous efforts to eradicate the problem, Chicago is again willing to accept the challenge. We intend to take whatever steps are necessary to prevent continued degradation of the quality of Lake Michigan water.

We hope to do this forcefully and intelligently. Without question, the need for drastic corrective action is of the greatest urgency. We urge all of the participants of this conference to pledge their effort to restore Lake Michigan to a quality level where all of the many millions of residents and tourists can share in the use of one of nature's most beautiful, functional and valuable resources.

This is not merely something that should be done, it is something that must be done.

Mr. Chairman, present with me today are many of our top engineers from the Chicago Water Department who are experts and will be happy to answer any questions.

I would like to present Mr. Hyman Gerstein, our Chief Water Engineer.

He is an outstanding water works engineer who will outline for you and the people in the audience the picture of water pollution in the Calumet area of Lake Michigan and will point out it's effect on our water.

The report which he will present has been prepared from available data on our water safety control section during the past fifteen years,

Thank you, Mr. Chairman.

CHAIRMAN STEIN: Thank you.

MR. GERSTEIN: Mr. Chairman, conferees, ladies and gentlemen:

My statement will concern the effect of pollution of the southern end of the lake on the operation of our filter plants and the general pollution of our water at our intakes.

I beg your indulgence in the fact that some portions of my statement will be repetitive, but I feel that it is necessary in order to make certain points.

The City of Chicago at present furnishes water supply to a population of approximately 4.5 million of which 3.5 million are in Chicago, and 1 million are in 63 suburbs in the metropolitan area.

Although no sewage and industrial wastes are discharged into Lake Michigan along the entire 30-mile stretch of lake front from the north boundary of Cook County to the mouth of the Calumet River, there exists gross pollution of the lake waters in the southern end of Lake Michigan from communities and industries in the Calumet area, and such pollution discharge is apparently on an increasing trend.

These polluted waters are frequently carried by wind-induced lake currents to the Chicago water works intakes, most seriously affecting the intakes supplying the South District Filtration Plant (SDFP) which furnishes water service to the south side of Chicago and 29 adjacent suburbs, to a total population of 1.8 million. Less frequently during prolonged periods of southerly winds the polluted waters are carried northward affecting the Dever and Wilson Avenue water intakes.

The South District Filtration Plant has consistently produced an excellent quality, safe and palatable water, even during the periods of heavy pollution of the water at its intakes, but we are deeply concerned for the future if the increasing trends of pollution are permitted to continue.

We are also concerned with the definite indication of degradation of the lake water quality in the southern end of Lake Michigan because of excessive nutrient pollution which has already produced undesirable changes in the nature of the microscopic plankton growths in the lake water.

Projections of the rate of increase in the frequency and severity of pollution incidence, and of the capacity of our treatment plant to handle these incidences, indicate that the time when the raw water can no longer be satisfactorily treated may soon come.

The next section is a summary and conclusions. After that, I will get into the full text of my statement.

1. We are generally in accord with the data presented and the conclusions drawn regarding the pollution of the waters of the southern end of Lake Michigan in the report prepared by the United States Public Health Service entitled,

"Pollution of the Waters of the Grand Calumet River, Little Calumet River, the Calumet River, Lake Michigan, Wolf Lake and their tributaries, Illinois-Indiana February 1965".

2. Following an epidemic on the south side of Chicago in the late fall of 1923, which resulted in 228 cases of typhoid fever and 23 deaths, the Water Safety Control Section was organized in 1924 in the Chicago Department of Health for the purpose of instituting strict control over chlorination treatment at the various pumping stations in the Chicago Water System and for the collection of data on the quality of the water at the lake intakes and of the chlorinated water supply furnished to the consumers.

An additional function of the section was the investigation of the sources of pollution in Lake Michigan in the vicinity of Chicago and the determination of the conditions which caused polluted water to be carried to the water intakes by lake currents.

In fact, my first assignment, when I came to work with the City in 1925, was to be in charge of the lake survey that the City was making of the lake waters off of Chicago.

In 1926 the Water Safety Control Section was transferred to the Water Department where it has continued as part of the Water Purification Division.

The Water Purification Division has accumulated a great mass of data over the last forty years pertaining to results of laboratory examination on extensive routine and special sampling to determine the quality of the water at the lake intakes as well as at various points in the lake opposite Chicago and in the rivers and streams discharging into Lake Michigan. It would be impractical to present all of the data available. We are, therefore, presenting data covering the last fifteen years, 1950-1964, which will best illustrate the year-by-year trends of pollution and its effects on the quality of the water at the Chicago waterworks intakes.

3. In 1926 Chicago began an extensive investigation of methods of treating the highly polluted water which was periodically received at the south side water intakes. The studies were carried on at the now world-famous experimental filtration laboratory located at Oglesby Avenue and 69th Street, where Mr. John R. Baylis and his associates developed the use of activated carbon for removal of difficult industrial waste odors from water and methods for high-rate filtration as well as other improvements in water treatment. The results of the studies were incorporated in the design of the South District Filtration Plant which was placed in full operation in 1947.

4. The industrial and sewage wastes of Chicago and the metropolitan area included in the Metropolitan

Sanitary District of Greater Chicago are discharged into the Sanitary Drainage Canal. No wastes are discharged along the entire lake front from the Cook County boundary on the north to the mouth of the Calumet River on the south, except for infrequent short periods of outflow of the Chicago River when the locks must be opened during heavy rainfall in order to prevent flooding.

However, continuous outflow into the lake of the Indiana Harbor Ship Canal and partial outflows from the Calumet River as well as direct discharges from sewer outlets along the lake off the Calumet Region have continuously polluted the southern end of Lake Michigan.

The intensity of pollution of the lake water has had upward and downward trends over a period of years, indicating occasional beneficial effects of treatments installed for abatement of pollution at times and also increases and decreases in industrial activity.

However, in the last ten years there has been a general increase in pollution of the lake. The most alarming features of the pollution picture are the indications of eutrophication of the lake, as well as increases in the number and intensity of periods when the quality of the intake water at the Chicago South District Filtration Plant has been seriously affected by the pollutants.

5. Our studies show that the polluted waters

from the south end of Lake Michigan off the Calumet area at times drift to the Chicago water works intakes under the influence of wind-induced lake currents. The South District Filtration Plant intakes are the closest to the pollution sources and are most frequently affected by the highest pollution concentrations.

Occasionally, with prolonged winds from southerly directions, slugs of pollution have drifted northward beyond the South District Filtration Plant intakes, ultimately reaching and affecting water at the Dever intake and at times traveling further north to the Wilson Avenue intake.

These long distances traveled by pollution can be best visualized if we consider that the South District Filtration Plant intakes are 9-1/4 miles from the mouth of the Indiana Harbor Ship Canal, the Dever intakes are 18-1/2 miles away and the Wilson Avenue intake is 22 miles distant from this point.

Our records show that in the past under very heavy pollution conditions and prolonged southerly winds, the pollution slugs have traveled as far north as the water intake at Waukegan, Illinois, which is about 50 miles north of the mouth of the Indiana Harbor Ship Canal.

6. During abnormal pollution periods at the water intakes at the South District Filtration Plant the water usually has objectionable "hydrocarbon type" odors which are

similar to odors which are obtained by diluting oil refinery waste effluents in lake water. During these pollution periods, the water also has excessive amounts of ammonia nitrogen, phenols and high coliform bacterial counts, creating more difficult operating problems in producing a satisfactory, safe and palatable water at the treatment plant.

It has been necessary to apply excessive dosages of chemicals such as alum coagulant, chlorine for disinfection and oxidation, and activated carbon for odor removal, in order to produce a satisfactory quality water.

In 1964 there were 28 periods of abnormally polluted water at the South District Filtration Plant intake covering a total of 89 days. During these periods, the odor threshold number reached a maximum of 90 (hydrocarbon) and the ammonia nitrogen a maximum of 0.496 ppm. The maximum chlorine dosage required for effective treatment was 56.1 pounds per million gallons and the maximum activated carbon dosage required for odor removal was 745 pounds per million gallons.

7. Results of various laboratory tests on the routine samples collected during weekly sampling surveys from various points on the Indiana Harbor Ship Canal, the Grand Calumet River, the Calumet River and Little Calumet River have positively shown that the major source of Lake Michigan pollution off the Calumet area has been the continuous discharge into the lake from the Indiana Harbor Ship Canal.

This canal is reported to have a flow rate of 700 to 900 cubic feet per second.

I was interested in hearing Mr. LeBosquet say yesterday that at the Dickey Road Bridge near the mouth of the Indiana Harbor Ship Canal, the flow was measured at 2,000 cubic feet per second.

In the last ten years, there has been a general increase in the annual average coliform bacteria, ammonia nitrogen and phenol in the waters discharged into the lake from the Indiana Harbor Ship Canal. Discharges into the lake also occur from the Calumet River when the hydraulic gradient changes due to temporary drops of the lake level, and when the runoff from the Little Calumet River is greater than can be handled by the capacity of the Sag Channel which connects to Illinois Drainage Canal.

8. The continuous and increasing trend of discharge of nutrients into the lake in the Calumet area, as illustrated by increases in the ammonia nitrogen content of the lake water in recent years, has resulted in definite signs of eutrophication of the water. This is exemplified by the increasing number of plankton organisms found and the changes in the character of the species found.

Cladophora, a long filamentous algae, appeared at the water intakes and has caused nuisances on the bathing beaches in the last three years. The increasing numbers of algae and some of the new species which have developed have at times caused serious interference with the filtration process, due to the shorter filter runs which have resulted.

9. Our recommendations for water quality criteria goals for Lake Michigan are directed toward maintaining the benefits of the naturally superior quality of lake water at our water works intakes. We urge that no further degradation of quality of the lake water be permitted and that contaminants be kept at the lowest level possible so that the capacity of our treatment plants to produce a pure, safe, sparkling, clear, palatable water for our consumers is not endangered.

Section C regards the Chicago Water Works System.

The Chicago Water Works System supplies a total population of approximately 4.8 million of which 3.5 million are in Chicago and 1 million are in 63 suburbs located adjacent to the city limits.

All of the suburbs supplied with Chicago water at the present time are located within the confines of the Metropolitan Sanitary District of Greater Chicago. The average daily pumpage in 1964 was 1,046 million gallons, of which 135 million gallons per day were supplied to the suburban municipalities. The all time peak day pumpage of the Chicago System was 1,529 million gallons on June 30, 1964, and the all time peak hour pumpage rate was 1,888 million gallons daily on June 29, 1964.

I would now like to start the slides, if you please. I will ask Mr. Pawlowski to point out on the slides the various points.

The entire water supply now receives filtration treatment at the South District Filtration Plant which supplies 37 percent of the total, and the new Central District Filtration Plant which supplies 63 percent of the total.

The South District Filtration Plant, located on made land along the lake front between 78th and 79th Streets supplies the entire south side of the city south of Pershing Road and adjacent suburbs.

The principal intake is the Dunne crib located about 2 miles off of 68th Street in about 32 feet of water. This intake is connected to the filter plant through a 14 and 16-foot tunnel. The plant also has a shore intake at the east end which is located in about 24 feet of water and is used as an alternate intake.

The plant which was placed in full operation in 1947 is now undergoing a fifty percent expansion of capacity, which will be completed late in 1965 and will provide a total rated capacity of 480 mgd and a peak capacity of 850 mgd. It supplies filtered water by gravity flow through underground tunnels to four pumping stations which serve a population of 1.8 million in Chicago and 29 suburbs.

The next slide, please.

The Central District Filtration Plant, which was placed in operation in October 1964, is located on made land on the lakeshore opposite Ohio Street just north of Navy Pier.

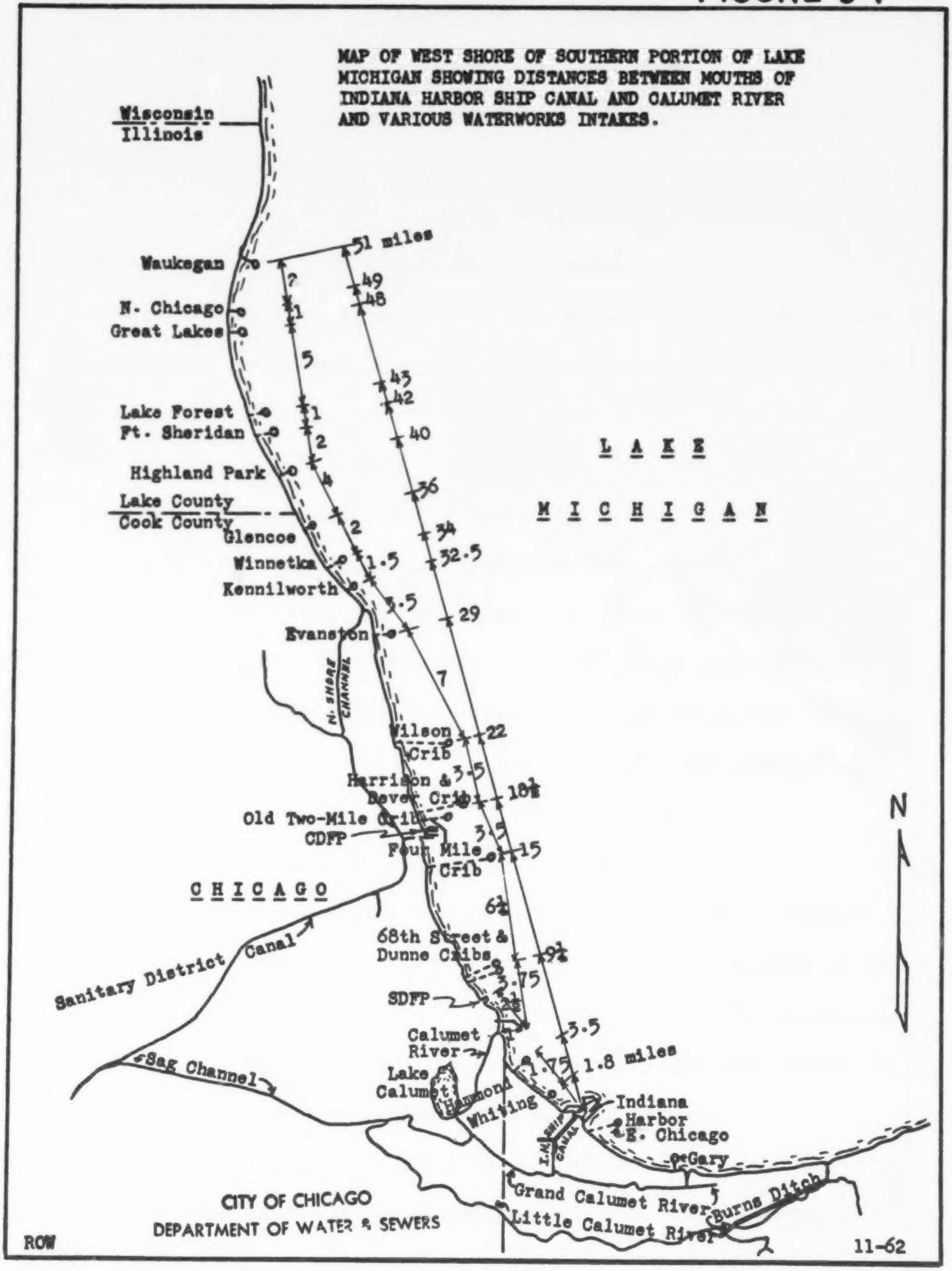
At present it obtains its water supply from a shore intake on the north end of the plant. In the near future, tunnel connections will be completed which will permit the plant to take its supply from the Dever and Harrison crib intakes which are located in the lake about 2.6 miles off of Chicago Avenue. The plant supplies the remainder of the area of Chicago north of Pershing Road and 34 adjacent suburbs, a total population of 2.7 million. Its rated capacity is 960 million gallons daily and peak capacity 1700 million gallons daily. The plant supplies seven pumping stations by gravity flow through tunnels.

The next slide, please.

The Wilson Avenue intake, which is located 2.1 miles from shore opposite Wilson Avenue, will be maintained as an emergency intake. The Four-Mile crib, which is located 3.1 miles offshore opposite 14th Street, is no longer used as an intake and will soon be razed. (See Map - Fig. C-1 on following page.)

The map on the screen shows the location of the two filter plants and the crib intakes, and also shows distances that the various intakes along the lake are from

FIGURE C-1



MAP OF WEST SHORE OF SOUTHERN PORTION OF LAKE MICHIGAN SHOWING DISTANCES BETWEEN MOUTHS OF INDIANA HARBOR SHIP CANAL AND CALUMET RIVER AND VARIOUS WATERWORKS INTAKES.

Wisconsin
Illinois
Waukegan
51 miles
7
49
48
N. Chicago
Great Lakes
1
5
43
42
Lake Forest
Ft. Sheridan
1
2
40
Highland Park
4
36
LAKE
MICHIGAN
Lake County
Cook County
Glencoe
2
34
Winnetka
1.5
32.5
Kennilworth
3.5
29
Evanston
N. SHORE CHANNEL
7
Wilson Crib
22
Harrison & Dever Crib
3.5
18½
Old Two-Mile Crib
CDFP
3.5
Four Mile Crib
15
N
CHICAGO
6½
68th Street & Dunne Cribs
9½
3.75
Sanitary District Canal
SDFP
2½
1
3.5
Calumet River
1.75
1.8 miles
Lake Calumet
Hammond
Whiting
Indiana Harbor
E. Chicago
Sag Channel
I.H. SHIP CANAL
Gary
Grand Calumet River
Burns Ditch
Little Calumet River

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DEPARTMENT OF WATER & SEWERS

ROW

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the pollution sources at the mouth of the Indiana Harbor Ship Canal and the mouth of the Calumet River.

For example, the Dunn intake is approximately 3-3/4 miles from the mouth of the Calumet River and 9-1/4 miles from the mouth of the Indiana Harbor Ship Canal; the Dever intake is 18-1/2 miles and the Wilson intake 22 miles north of the mouth of the Indiana Harbor Ship Canal.

My next section is the effect of lake pollution on water quality.

There are no sewage or industrial wastes discharged into Lake Michigan along the 30 miles of lakefront extending from the Cook County limits on the north to the mouth of the Calumet River on the south.

I have repeated this a number of times and I feel that this repetition cannot be overdone because there is no waste being discharged off the Chicago area.

The principal source of pollution at the Chicago intakes has been from the southern end of Lake Michigan which receives the discharges of waste from the Indiana Harbor Ship Canal, various industrial sewer outlets on the lake off the Calumet area, and the fluctuating discharges from the Calumet River.

The South District Filtration Plant intakes being the closest to the source of pollution are the most seriously affected. In addition, the intakes are exposed to pollution from occasional illegal discharges of wastes from lake vessels and small craft, and also the infrequent short period reversals of the Chicago River when the locks are opened during heavy rainfall runoff in order to prevent flooding.

Pollution effects from sewage effluent discharges from communities in Lake County, Illinois, and other communities to the north, at the present time, are of lesser significance than the other pollution sources mentioned.

Filter backwash water and settling basic sediment are discharged into the lake from the South District Filtration Plant and the Central District Filtration Plant. I am covering the point that was made by Mr. LeBosquet when he showed the slide of the South District Filtration Plant yesterday with an indication of discharge of the filter backwash water on one corner.

The solids in these discharges contain material that was in the original lake water plus the chemicals added for treatment which include the coagulants and spent activated carbon. This material is completely innocuous and our experience has been that it has produced no problems on the lake.

The next slide, please.

The results of bacteriological examination of samples of water collected daily from the Wilson Avenue, Dever and South District Filtration Plant intake supplies for the fifteen year period, 1950-1964, are summarized in Table D-1, and shown on the screen (See Table D-1 on next page).

These show the annual averages and maximum day results. (See Fig. D-1 on page 401)

I think the material in these slides is more significantly shown in the next slide which in chart form shows a definitely increasing trend of the annual average coliform per 100 milliliters (ml) in the intake water at the South District Filtration Plant which is closest to the sources of pollution from the Calumet area, while the other intakes to the north show a much lesser degree of bacterial pollution. (Continue text on page 402)

TABLE D-1

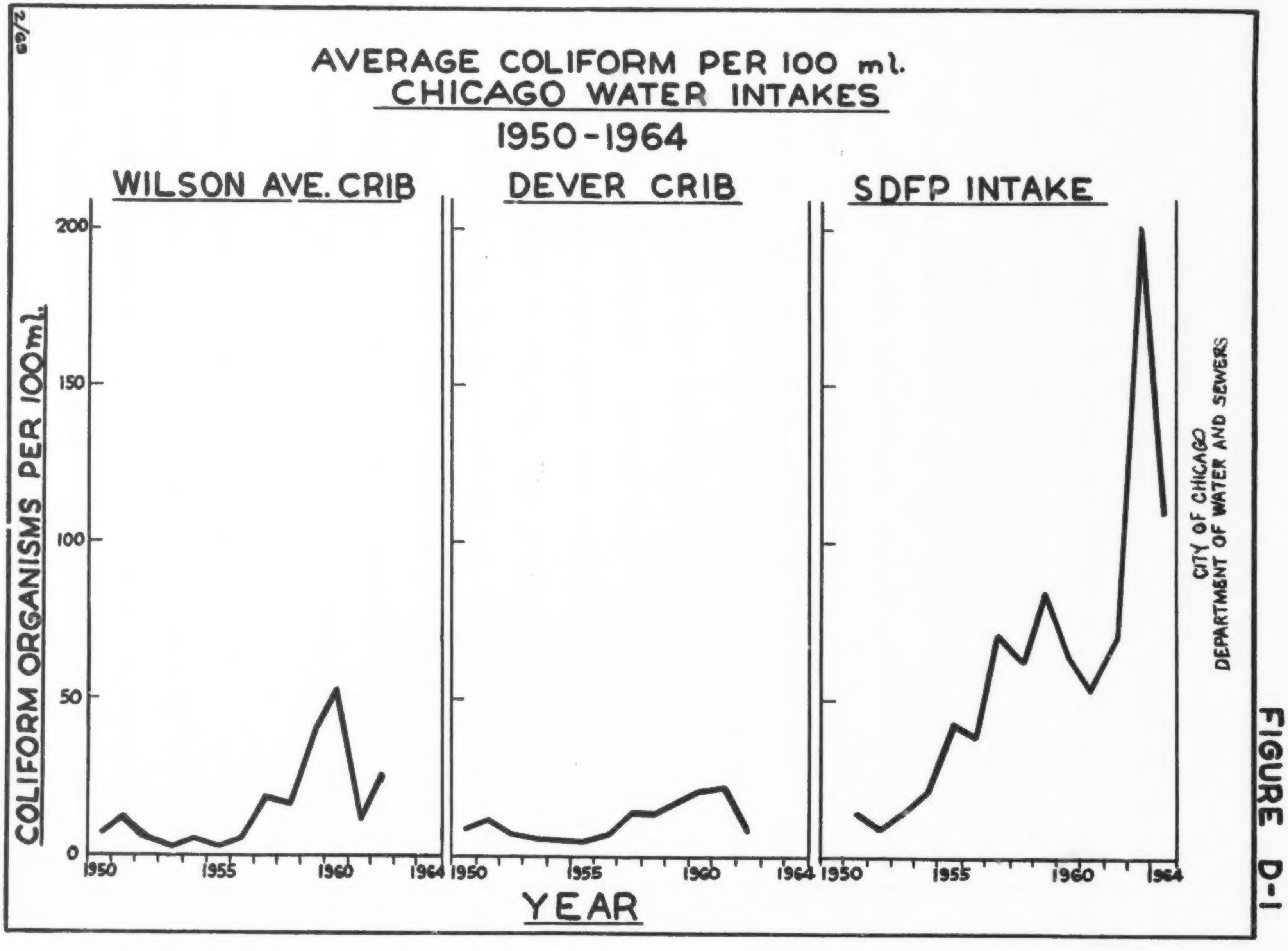
RAW LAKE WATER BACTERIAL QUALITY
COLIFORM ORGANISMS PER 100 ML
CHICAGO WATER INTAKES

	WILSON AVE. CRIB		DEVER CRIB		SDFP INTAKES	
Year	Annual Average	Maximum Day	Annual Average	Maximum Day	Annual Average	Maximum Day
1950	7.9	852	9.2	400	*	*
1951	12.8	1700	10.9	230	14.0	375
1952	7.1	330	8.1	850	9.7	495
1953	3.1	78	7.0	790	13.9	534
1954	6.4	1100	6.9	330	20.0	959
1955	3.2	110	5.8	140	42.3	1300
1956	5.3	270	7.4	200	38.7	1400
1957	19.3	1900	14.1	2000	70.8	9600
1958	17.3	1300	13.9	490	63.1	6400
1959	40.5	3500	18.4	1300	85.6	3200
1960	52.5	3500	20.5	700	65.2	2900
1961	10.9	300	21.6	790	52.4	3000
1962	26.9	-	9.2	-	69.5	1700
1963	*	*	*	*	200.8	5800
1964	*	*	*	*	110.2	1900

*Chlorinated water

City of Chicago
Department of Water & Sewers

FIGURE D-1



AVERAGE COLIFORM PER 100 ml.
CHICAGO WATER INTAKES
1950-1964

Next slide, please.

The most seriously polluted condition of the water at the intakes of the South District Filtration Plant when slugs of wastes drifting to the intake have abnormal "hydrocarbon" odors which are similar to those which are obtained by diluting oil refinery waste effluent with lake water. The water during these periods of objectionable odors also usually has a high ammonia nitrogen and phenol content, and has abnormal chlorine absorbing properties all of which increase the difficulty of producing a satisfactory water in the treatment plant.

These data on abnormal "oil refinery" type odor periods for the fifteen year period, 1950-1964, are tabulated on an annual basis in Table D-2, which shows the number of odor periods and the total days included in these periods for each year; also shown are the frequency of various intensities of maximum threshold odor numbers which occurred during the periods, and the maximum activated carbon dosage required to treat the water (See Table D-2 and Figure D-2 on following pages).

In 1964 there were 28 days of abnormal odors covering a total of 89 days with a maximum threshold odor number during one of the periods of 90 (hydrocarbon). These data are charted in Figure D-2 which shows a generally upward trend of pollution in the water during the last ten years. These data are charted in the next slide which shows a generally upward

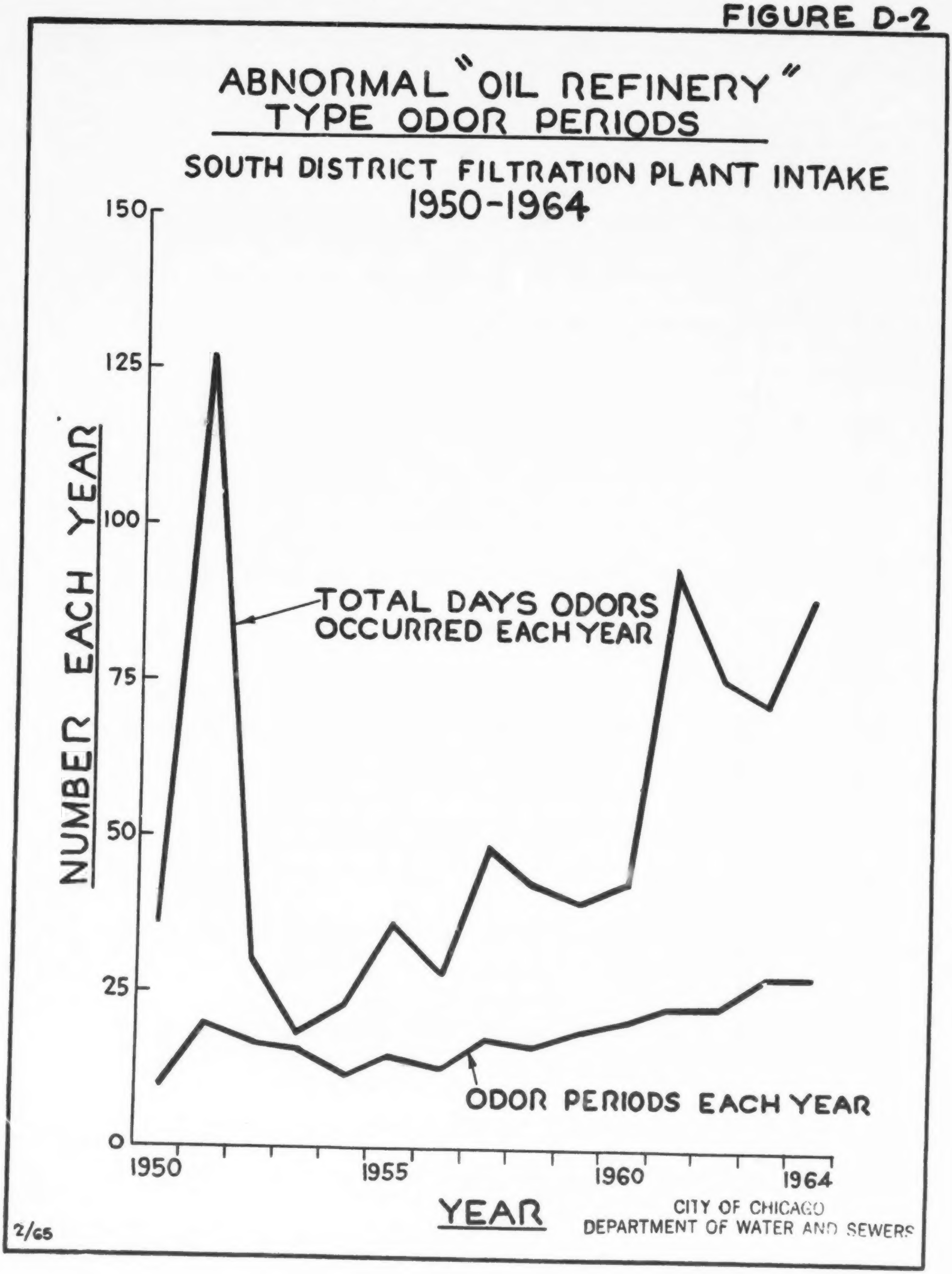
(Continue text on page 405)

Table D-2

SUMMARY OF "OIL REFINERY WASTE" TYPE ABNORMAL ODOR PERIODS IN RAW LAKE WATER SUPPLY TO SOUTH DISTRICT FILTRATION PLANT 1950-1964

Year	Number of Odor Periods	Total Odor Days	Maximum Threshold Odors During Periods 4-20	21-50	51-100	Maximum Activated Carbon Dosage Applied #/MG
1950	10	36	6	3	1	1,153
1951	20	127	16	4	-	446
1952	17	30	16	1	-	590
1953	16	18	16	-	-	266
1954	12	23	11	1	-	356
1955	15	36	15	-	-	279
1956	13	28	12	1	-	415
1957	18	49	18	-	-	325
1958	17	43	16	1	-	503
1959	19	40	17	2	-	712
1960	21	42	20	1	-	324
1961	23	94	23	-	-	388
1962	23	76	23	-	-	370
1963	28	72	27	1	-	680
1964	28	89	27	-	1	745

FIGURE D-2


ABNORMAL "OIL REFINERY" TYPE ODOR PERIODS
SOUTH DISTRICT FILTRATION PLANT INTAKE
1950-1964
NUMBER EACH YEAR
150
125
100
75
50
25
0
TOTAL DAYS ODORS OCCURRED EACH YEAR
ODOR PERIODS EACH YEAR
1950
1955
1960
1964
YEAR
CITY OF CHICAGO
DEPARTMENT OF WATER AND SEWERS
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trend of pollution in the water during the last ten years.

It is interesting to note that in the various charts prepared as part of this presentation, there are shown peak values of the various pollution parameters in the years 1950-1951 which are followed by a reduction in these values for the next few years subsequent to which these parameters followed a definitely upward trend in the last ten years. It is possible that the decline in pollution severity following 1950-1951 was due in a large part to the industries exercising better control of their waste discharges.

Next slide, please. (Table D-3 on following page)

A summary for the period 1950-1964 of the maximum ammonia nitrogen which occurred during the pollution periods each year is presented in Table D-3 which shows, during 1964, a maximum of 0.496 parts per million ammonia nitrogen and requiring a maximum chlorine dosage of 56.1 pounds per million gallons. The data charted in Figure D-3 shows the same general increasing trend during the last ten years of ammonia nitrogen.

Next slide, please.(Fig. D-3 on following page)

The table on the screen shows the total pounds of activated carbon used each year at the South District Filtration Plant during 1950-1964 and the annual average activated carbon dosage and the maximum activated carbon dosage during pollution periods. (See Table D-4 on following page.)

(See Figure D-4 on page 408-A)

In 1964, 3,773,655 pounds of activated carbon

(Continue text on page 409)

TABLE D-3

SUMMARY OF MAXIMUM AMMONIA NITROGEN IN INTAKE WATER SUPPLY, AND ACTIVATED CARBON AND CHLORINE APPLIED DURING ABNORMAL ODOR POLLUTION PERIODS SOUTH DISTRICT FILTRATION PLANT, 1950-1964

Year	Maximum Ammonia Nitrogen (ppm)	Maximum Activated Carbon Dosage (#MG)	Maximum Chlorine Dosage (#/MG)
1950	0.276	1,158	84.0
1951	0.196	446	45.5
1952	0.248	590	45.1
1953	0.120	266	35.4
1954	0.148	356	20.8
1955	0.125	279	24.3
1956	0.180	415	24.4
1957	0.248	325	26.8
1958	0.680	503	19.4
1959	0.290	712	24.5
1960	0.272	324	16.0
1961	0.358	388	20.3
1962	0.590	370	27.2
1963	0.230	680	42.8
1964	0.496	745	56.1

FIGURE D-3

MAXIMUM AMMONIA NITROGEN DURING ABNORMAL "OIL REFINERY" TYPE ODOR PERIODS

SOUTH DISTRICT FILTRATION PLANT INTAKE

1950 - 1964

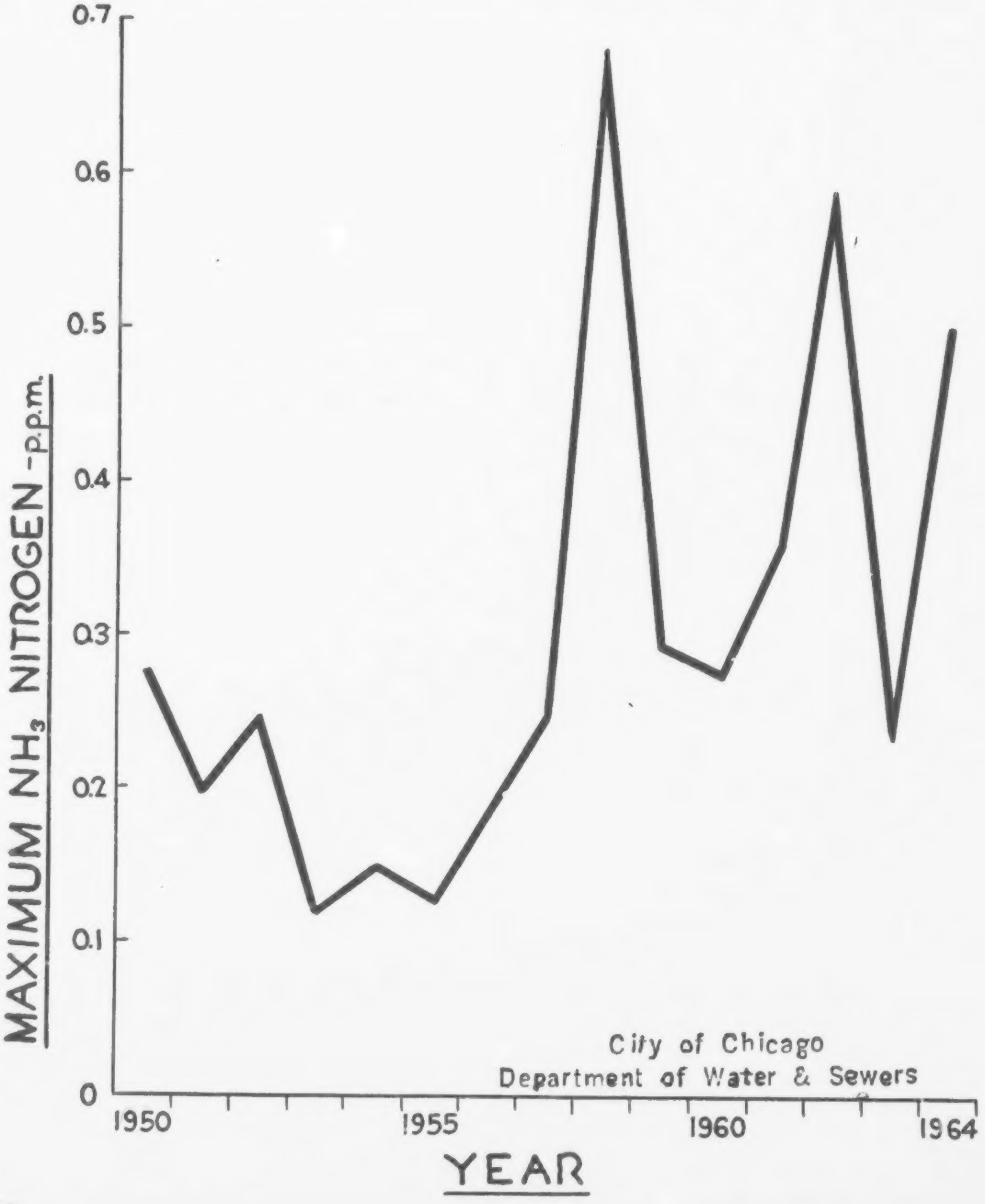

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Table D-4

SUMMARY OF ACTIVATED CARBON APPLIED FOR REMOVAL OF ODORS IN LAKE WATER
SOUTH DISTRICT FILTRATION PLANT
1950-1964

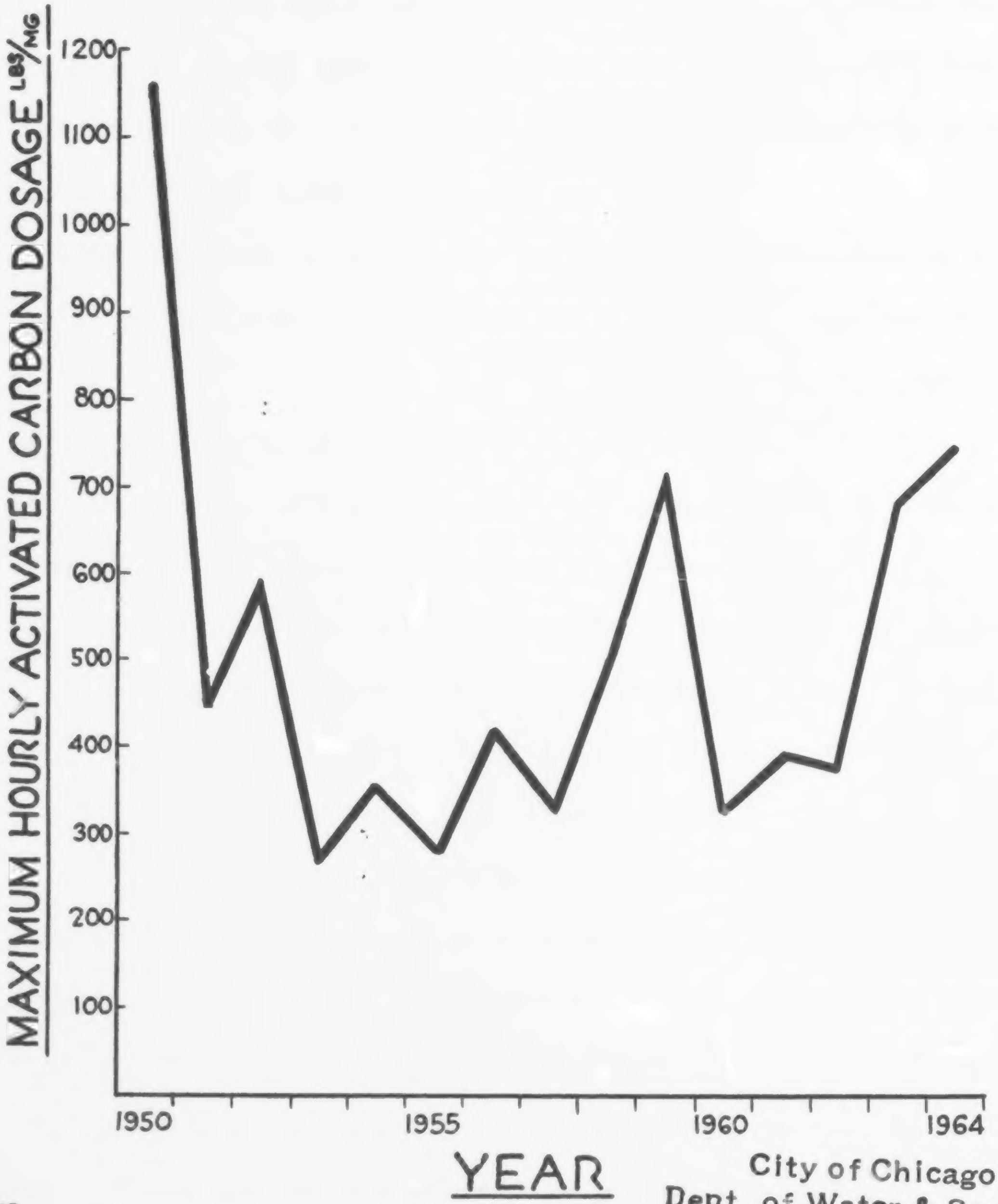
Year	Total Activated Carbon Applied (#)	Average Carbon Dosage (#/MG)	Maximum Hourly Carbon Dosage during Odor Periods (#/MG)
1950	2,874,905	25.5	1,158
1951	3,545,552	30.7	446
1952	3,203,426	26.3	590
1953	1,775,063	13.9	266
1954	2,011,359	15.7	356
1955	2,057,781	16.6	279
1956	1,981,108	16.0	415
1957	3,032,729	24.0	325
1958	2,762,540	22.0	503
1959	3,035,509	23.0	712
1960	2,727,005	20.7	324
1961	2,632,923	20.6	388
1962	2,865,541	21.6	370
1963	3,194,443	22.8	680
1964	3,773,655	26.7	745

FIGURE D-4

MAXIMUM ACTIVATED CARBON DOSAGE DURING ABNORMAL "OIL REFINERY" TYPE ODOR PERIODS

SOUTH DISTRICT FILTRATION PLANT INTAKE

1950 - 1964



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Dept. of Water & Sewers

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were used and the maximum carbon dosage was 745 pounds per million gallons. The next slide is a chart showing the generally upward trend of maximum activated carbon dosages.

Next slide, please. (See Table D-5 on following page.)

Tests for phenol in the water collected during the abnormal pollution periods at the South District Filtration Plant are recorded in the slide shown which shows a summary of phenol determinations for the period 1955 to date.

Only the samples tested which show the presence of phenol are summarized. It will be noted that a phenol content as high as 14 parts per billion was found in the intake water.

The next section is on data on pollution of rivers discharging into the lake, 1950-1964.

Beginning with 1948 the Water Purification Division has collected samples one day each week at various - that is, every Tuesday - at various established points in the Grand Calumet River, Indiana Harbor Ship Canal, Calumet River and the Little Calumet River. The total number of samples collected on a sampling day varied from 16 to 23.

I might say that we have had full cooperation from the Indiana people in permitting us to collect these samples and that we have furnished them with results of tests that we made on these samples during the entire period.

Laboratory examinations were made for threshold

(Continue Text on page 411)

TABLE D-5

SUMMARY OF PHENOL TESTS
MADE DURING ABNORMAL "OIL REFINERY" TYPE ODOR PERIODS

RAW WATER SOUTH DISTRICT FILTRATION PLANT

YEAR	NO. OF SAMPLES SHOWING PHENOLS	PHENOL PARTS PER BILLION AVG.	MAX.	MIN.
1950	3	7	12	2
1957	6	3	4	2
1958	1	1	1	1
1959	0	0	0	0
1960	-	-	-	-
1961	3	2	3	1
1962	158	3	11	1
1963	103	3	14	1
1964	32	3	6	1

No samples tested since August, 1964

City of Chicago
Department of Water & Sewers

odor, ammonia nitrogen, coliform bacteria and hydrogen ion concentration on each sample, and on selected samples examinations were made for phenol, ABS, fluorides and radioactive beta counts.

(See Table E-1 and Figs. E-1 and E-2 on following pages.)

Next slide, please.

This slide shows a typical summary of results of a one-day sampling survey. This was made on October 27, 1964. The same data is charted on the next slide and you will notice in the upper left-hand corner the legend which shows on the upper part, the figure on the upper part of it says ammonia nitrogen, parts per million, and the lower is phenol.

This is a map on which the ammonia nitrogen and phenol content of the water at the various points in the river system are shown. The ammonia nitrogen results and observations of direction of river flow indicate that the Calumet River was positively flowing away from the lake toward the Cal-Sag Channel on that day.

You will notice that the results of ammonia and phenol from the mouth of the river up to about 138th Street are about the same, indicating the quality of the water that was coming in from the lake.

On the other hand, if you look at the result at the Indiana Harbor Ship Canal at Dickey Road, you will find quite high results.

(Continue text on page 415)

TABLE E-1

SOUTH DISTRICT FILTRATION PLANT

SPECIAL POLLUTION SURVEY

GRAND CALUMET RIVER,
INDIANA HARBOR SHIP CANAL,
CARNEGIE ILLINOIS STEEL CORP.

DATE: 10-27-64
SAMPLES COLLECTED 10-27-64
SAMPLES RUN 10-27-64

NO.	LOCATION	THRESHOLD ODOR HOT	PH	NH_3N PPM	DETERGENT A.B.S. PPM	PHENO PPM	FLUORIDES PPM	CHLORIDES PPM	RADIOACTIVITY MMC / LITER
1.	92 NO ST. & RIVER	5DMm	8.0	0.36	TR	0.009		9	
2	95 TH " " "	6DMm	8.2	0.26			0.06		
3.	100 " " " "	8DMm	8.1	0.32					
4	106 " " " "	6DMm	8.1	0.32					
5.	126 " " " "	10DMA	7.4	0.18	TR	0.008			
6.	138 " " " "(AT TORRENCE)	30DMA	7.0	4.00			3.20		
6A	BURNHAM AVE. AND GRAND CALUMET RIVER	NS	7.4	8.50	2.40	0.018			
6B	134 TH. AND INDIANA AVE.	6DMm	7.5	2.[illegible]0	0.11	0.034			
7	FORSYTHE & I.H.S.C.	600Gh	7.4	3.50					
8.	CANAL " "	40DMA	7.3	2.20					
9.	DICKEY " "	NS	7.3	2.50	0.88	0.062	0.54	21	
10.	141 ST. " "	10DsM	7.2	1.70					
11.	CHICAGO " "	12DsM	7.3	1.60			0.57		
12.	151 ST. " "	35DsM	7.4	1.70					
13.	FORSYTHE & G.C. RIVER	60DsM	7.4	7.00					
14	KENNEDY " " "	45DMA	7.2	1.40	0.12	0.050			
15	CLINE " " "	60DMA	7.5	2.20			0.53		
15X	" " " "(E.SEWER)	140DsM	8.0	1.00					
15XX	" " " "(W.SEWER)	120DsM	8.2	0.80	0.34	0.147			
	CARNEGIE ILLINOIS STEEL		8.5	0.30					
A	NORTH SLIP- INTAKE	6DMC	8.0	0.40					
B	" " - DISCHARGE	5DMA	7.8	0.30					
1-A	MOUTH OF CALUMET RIVER	6DMm	8.2	0.28					

AVERAGE LAKE MICHIGAN RAW WATER FOR WEEK ENDING WITH ______	
AVE.	
MAX.	
MIN.	

R. E. Watkins
WATER CHEMIST II

James C Vaughn
CHIEF FILTRATION ENGINEER

WEEKLY POLLUTION SURVEYS
LOCATION OF SAMPLING POINTS

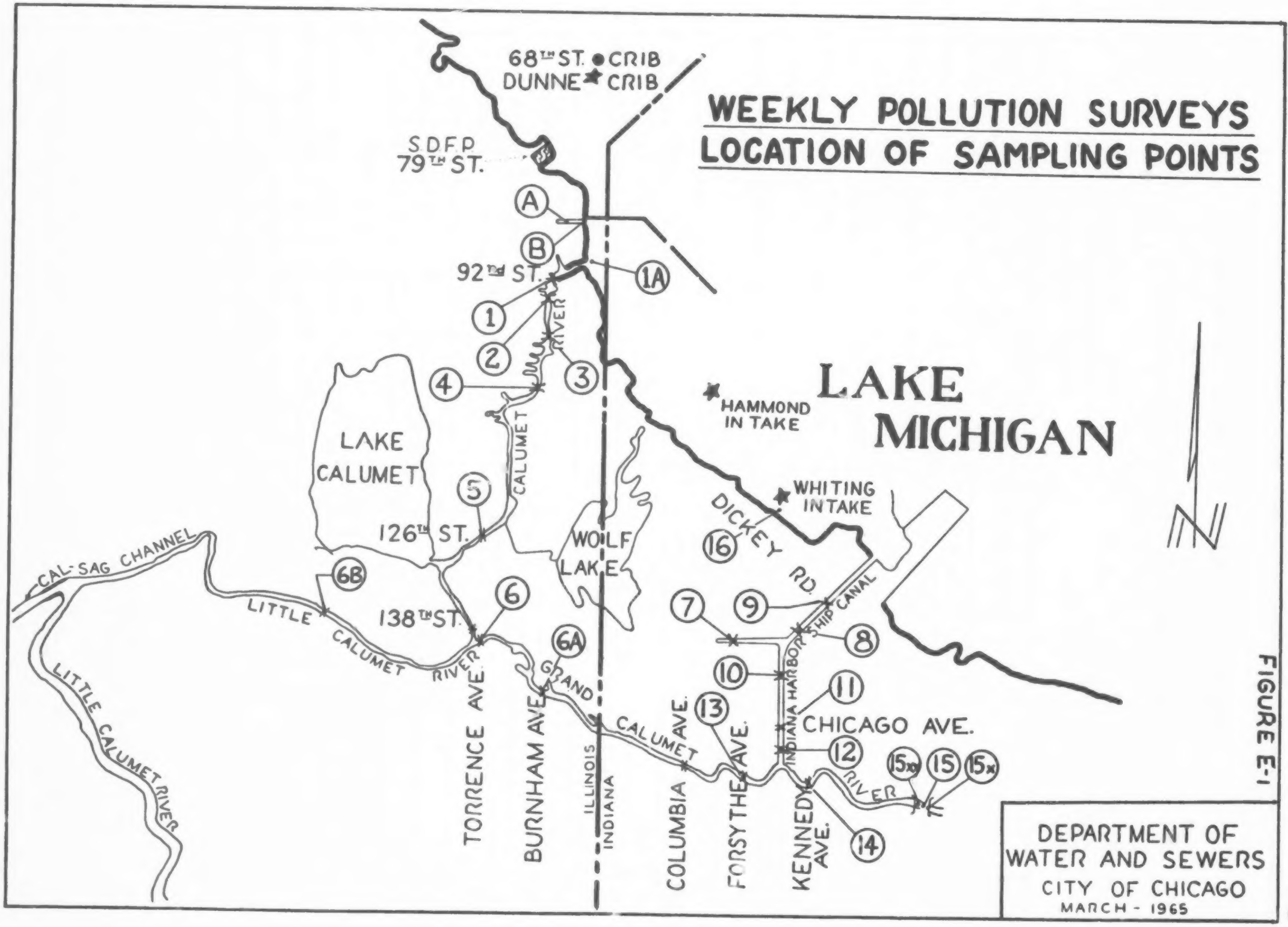

68TH ST. CRIB
DUNNE CRIB
S.D.F.P.
79TH ST.
A
B
92ND ST.
1A
1
2
3
4
RIVER
CALUMET
LAKE CALUMET
5
126TH ST.
6B
138TH ST.
6
6A
WOLF LAKE
HAMMOND IN TAKE
LAKE MICHIGAN
WHITING INTAKE
DICKEY RD.
16
7
9
8
10
11
12
13
14
15xx
15
15x
SHIP CANAL
INDIANA HARBOR
CHICAGO AVE.
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
LITTLE CALUMET RIVER
GRAND CALUMET RIVER
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
KENNEDY AVE.
N

FIGURE E-1

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

RESULTS
WEEKLY POLLUTION SURVEY
OCTOBER 27, 1964

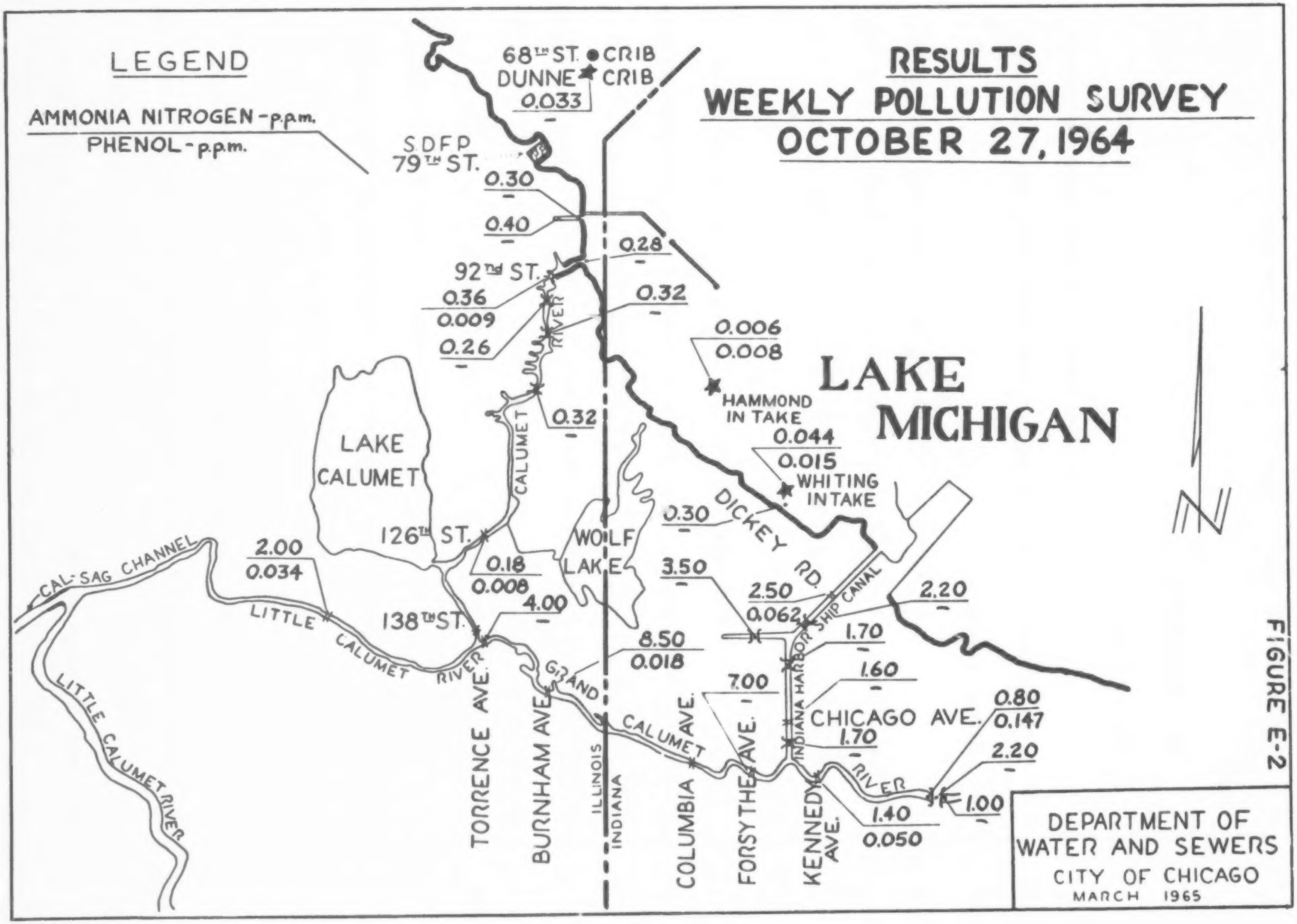

LEGEND
AMMONIA NITROGEN - p.p.m.
PHENOL - p.p.m.
68TH ST. CRIB
DUNNE CRIB
0.033
–
S.D.F.P.
79TH ST.
0.30
–
0.40
–
0.28
–
92ND ST.
0.36
0.009
0.26
–
0.32
–
RIVER
0.32
–
CALUMET
0.006
0.008
HAMMOND IN TAKE
LAKE MICHIGAN
0.044
0.015
WHITING INTAKE
LAKE CALUMET
126TH ST.
WOLF LAKE
0.18
0.008
0.30
–
DICKEY RD.
2.00
0.034
CAL-SAG CHANNEL
3.50
–
2.50
0.062
SHIP CANAL
2.20
–
138TH ST.
4.00
–
LITTLE CALUMET RIVER
8.50
0.018
1.70
–
INDIANA HARBOR
1.60
–
GRAND CALUMET RIVER
7.00
–
CHICAGO AVE.
0.80
0.147
1.70
–
2.20
–
1.00
–
1.40
0.050
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
KENNEDY AVE.
LITTLE CALUMET RIVER
N

FIGURE E-2

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH 1965

I can't read it right from here -- what is that?

MR. PAWLOWSKI: 2.5

MR. GERSTEIN: 2.5

Now, also on the Grand Calumet River east of the Indiana Harbor Ship Canal we had some very high ammonia and phenol results.

At the time of sampling at the various points on the rivers, observations were made of the direction of the river flows, but no quantitative measurement was made of the flows in the streams.

Our results of the surveys, therefore, have qualitative value but have the weakness of not being quantitative as related to total flows. However, in case of the Indiana Harbor Ship Canal which was at all times found to flow to the lake, reliable data is available showing that the flow has been in the range of 700 to 900 cubic feet per second.

As I found out yesterday, at the Dickey Road Bridge--where our samples showed the character of the water being discharged into the lake--Mr. LeBosquet said their measurement showed two thousand cubic feet per second.

The amount and the direction of flow in the different reaches of the Calumet River at the time of sampling were influenced by the amount of diversion being drawn from the lake through the Cal-Sag Channel, lake level fluctuations and the drainage runoff from the connecting rivers.

We have prepared fifteen charts, one for each year for the period 1950-1964, showing the annual average and maximum ammonia nitrogen values in parts per million at various points on the rivers, and the annual average of coliform bacteria per 100 milliliters at each point (See Figs.E-3(a) through E-3(o) on following pages)

I will not bore you with showing all these slides. They are in the text of our statement for anyone who wants to look it over. However, I will show you just a few slides to show you just how they look.

Next slide, please.

These slides show, on the upper part of the line, the average annual ammonia nitrogen in one type of brackets and the maximum result of ammonia nitrogen in other brackets and underneath the line, the average coliform per 100 milliliters.

You will notice that the greater amount is at the mouth of the Indiana Harbor Ship Canal.

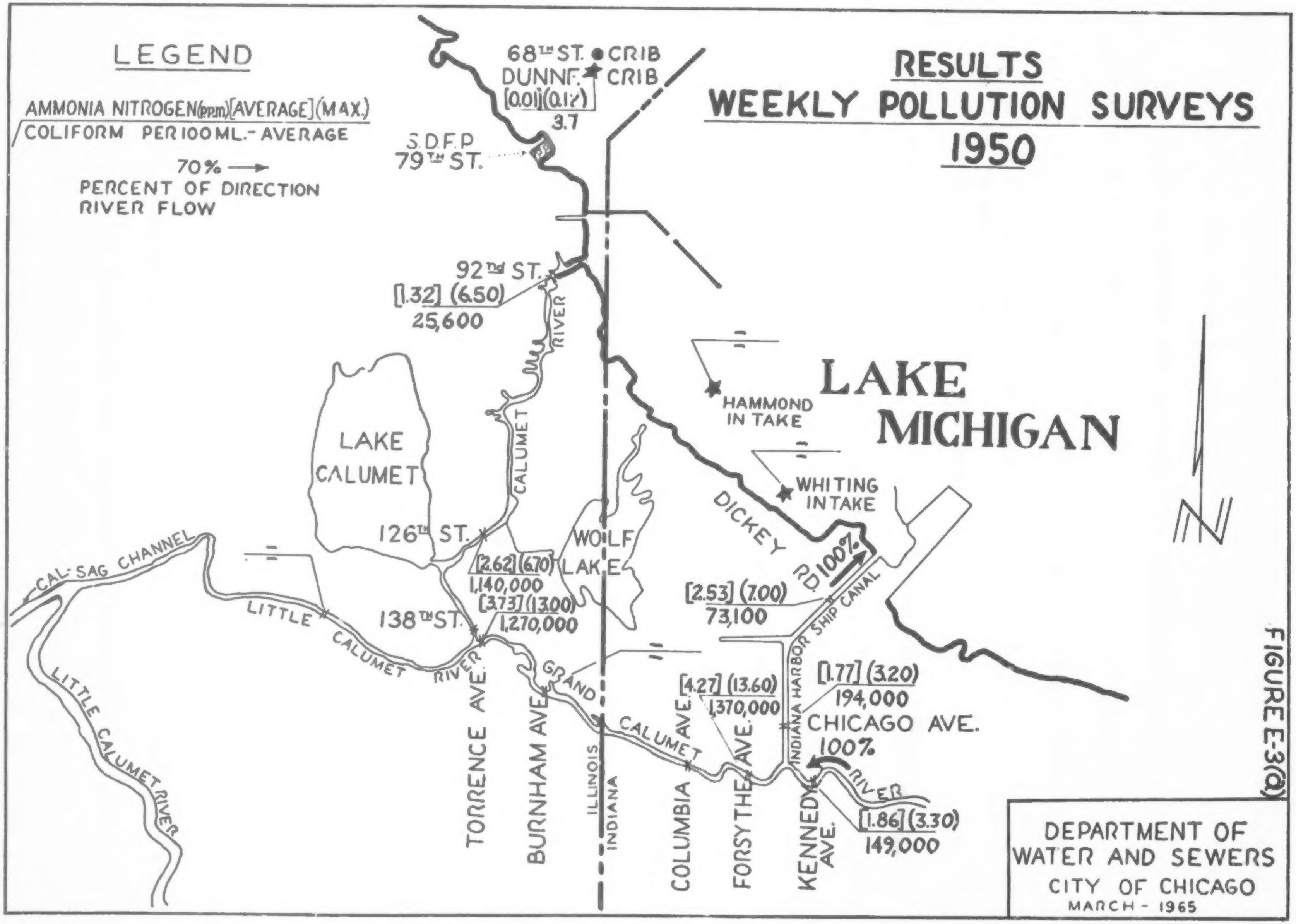
Next slide, please.

I think that is 1955.

Next slide, please.

That is 1960. You will notice the arrows at the mouth of the Calumet River which show the percentage of the time of our observations when the river was flowing toward the lake and at the Indiana Harbor Ship Canal where it shows

(Continue on page 432)



RESULTS
WEEKLY POLLUTION SURVEYS
1950

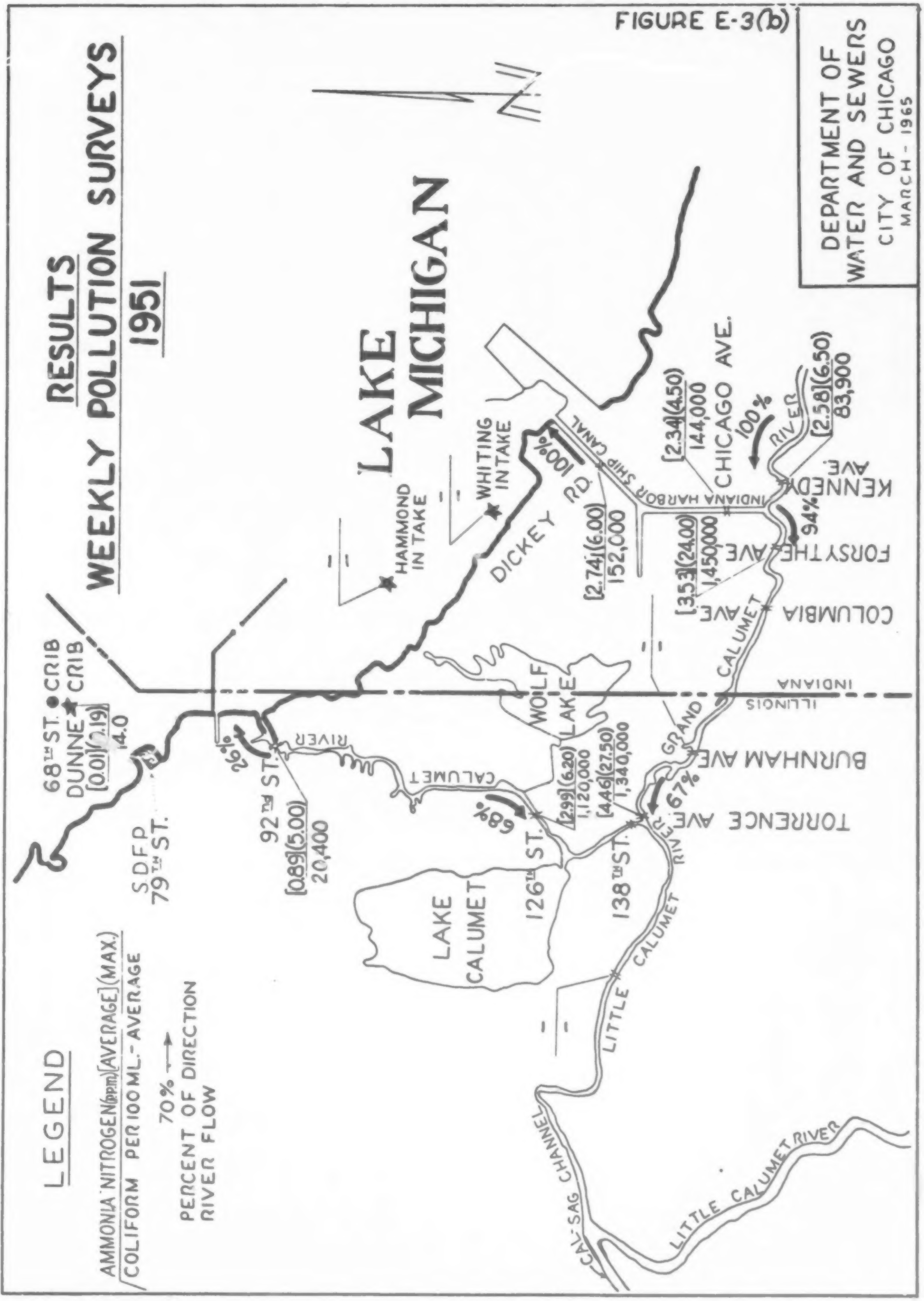
FIGURE E-3(a)

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

LEGEND
AMMONIA NITROGEN(ppm)[AVERAGE](MAX.)
COLIFORM PER 100 ML.- AVERAGE
70% →
PERCENT OF DIRECTION
RIVER FLOW
68TH ST. CRIB
DUNNE CRIB
[0.01](0.17)
3.7
S.D.F.P.
79TH ST.
92ND ST.
[1.32](6.50)
25,600
RIVER
CALUMET
LAKE CALUMET
126TH ST.
[2.62](6.70)
1,140,000
[3.73](13.00)
1,270,000
138TH ST.
WOLF LAKE
LAKE MICHIGAN
HAMMOND IN TAKE
WHITING IN TAKE
DICKEY RD.
100%
[2.53](7.00)
73,100
INDIANA HARBOR SHIP CANAL
[1.77](3.20)
194,000
CHICAGO AVE.
100%
[4.27](13.60)
1,370,000
[1.86](3.30)
149,000
RIVER
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
LITTLE CALUMET RIVER
GRAND CALUMET
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
KENNEDY AVE.
N

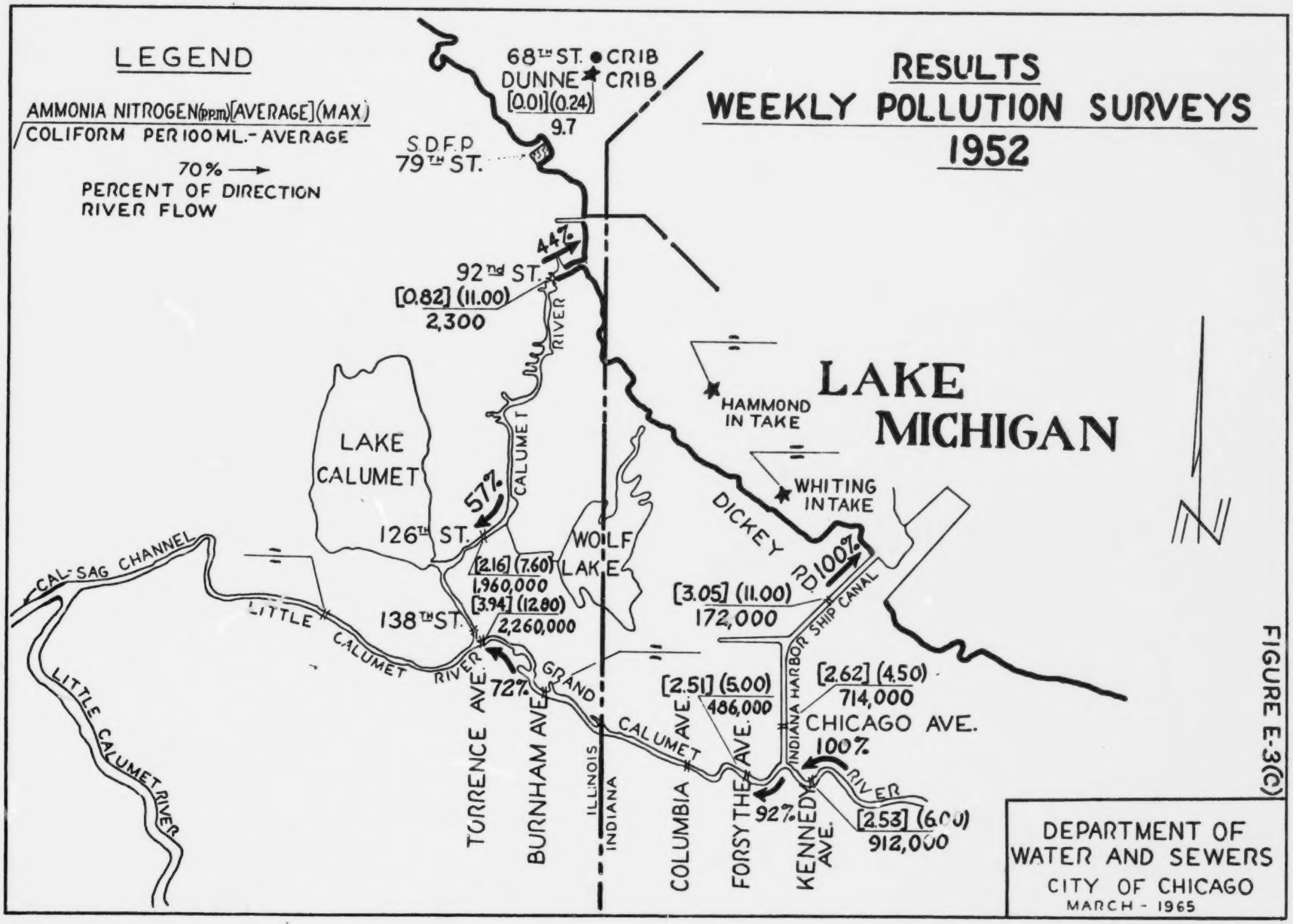
FIGURE E-3(b)

RESULTS WEEKLY POLLUTION SURVEYS 1951


LAKE MICHIGAN
LEGEND
AMMONIA NITROGEN(ppm) [AVERAGE] (MAX.)
COLIFORM PER 100 ML. - AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. CRIB
DUNNE CRIB
[0.01](0.19)
14.0
S.D.F.P. 79TH ST.
92ND ST.
[0.89](5.00)
20,400
26%
HAMMOND INTAKE
WHITING INTAKE
DICKEY RD.
100%
[2.74](6.00)
152,000
INDIANA HARBOR SHIP CANAL
[2.34](4.50)
144,000
CHICAGO AVE.
100%
RIVER
[2.58](6.50)
83,900
KENNEDY AVE
94%
[3.53](24.00)
1,450,000
FORSYTHE AVE
COLUMBIA AVE
GRAND CALUMET
INDIANA
ILLINOIS
WOLF LAKE
CALUMET RIVER
68%
[2.99](6.20)
1,120,000
[4.46](27.50)
1,340,000
BURNHAM AVE
67%
TORRENCE AVE
126TH ST.
138TH ST.
LAKE CALUMET
LITTLE CALUMET RIVER
CAL-SAG CHANNEL
LITTLE CALUMET RIVER

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

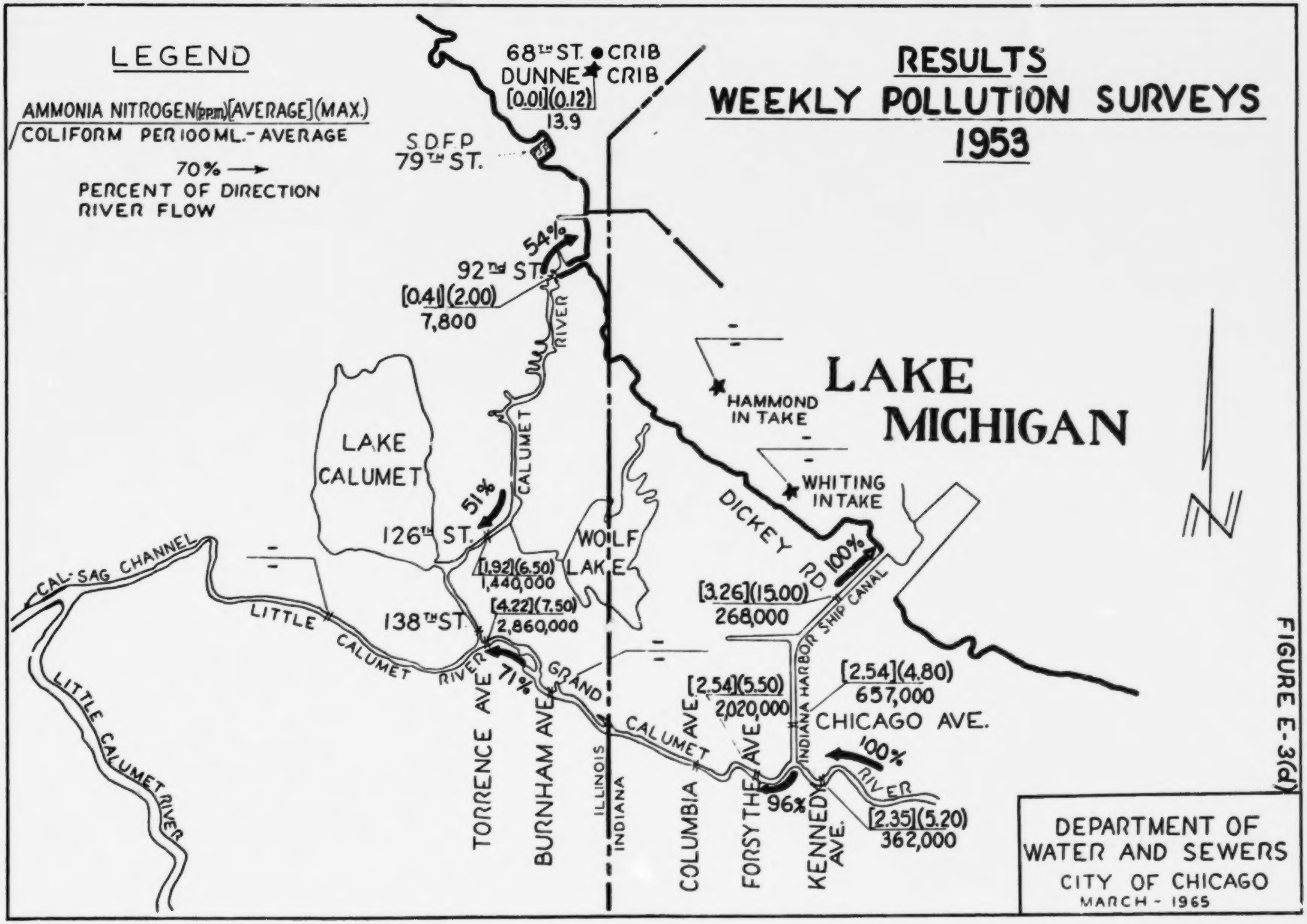
FIGURE E-3(C)


LEGEND
AMMONIA NITROGEN(p.p.m.)[AVERAGE](MAX)
COLIFORM PER 100 ML.- AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. ● CRIB
DUNNE ★ CRIB
[0.01](0.24)
9.7
S.D.F.P. 79TH ST.
44%
92ND ST.
[0.82] (11.00)
2,300
LAKE MICHIGAN
HAMMOND IN TAKE
WHITING INTAKE
DICKEY RD.
100%
[3.05] (11.00)
172,000
LAKE CALUMET
57%
126TH ST.
CALUMET RIVER
WOLF LAKE
[2.16] (7.60)
1,960,000
[3.94] (12.80)
2,260,000
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
138TH ST.
72%
GRAND CALUMET
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
[2.51] (5.00)
486,000
FORSYTHE AVE.
92%
KENNEDY AVE.
INDIANA HARBOR SHIP CANAL
[2.62] (4.50)
714,000
CHICAGO AVE.
100%
RIVER
[2.53] (6.00)
912,000
N

RESULTS
WEEKLY POLLUTION SURVEYS
1952

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

FIGURE E-3(d)



RESULTS
WEEKLY POLLUTION SURVEYS
1953

LEGEND

AMMONIA NITROGEN(ppm)[AVERAGE](MAX.)
COLIFORM PER 100 ML.- AVERAGE

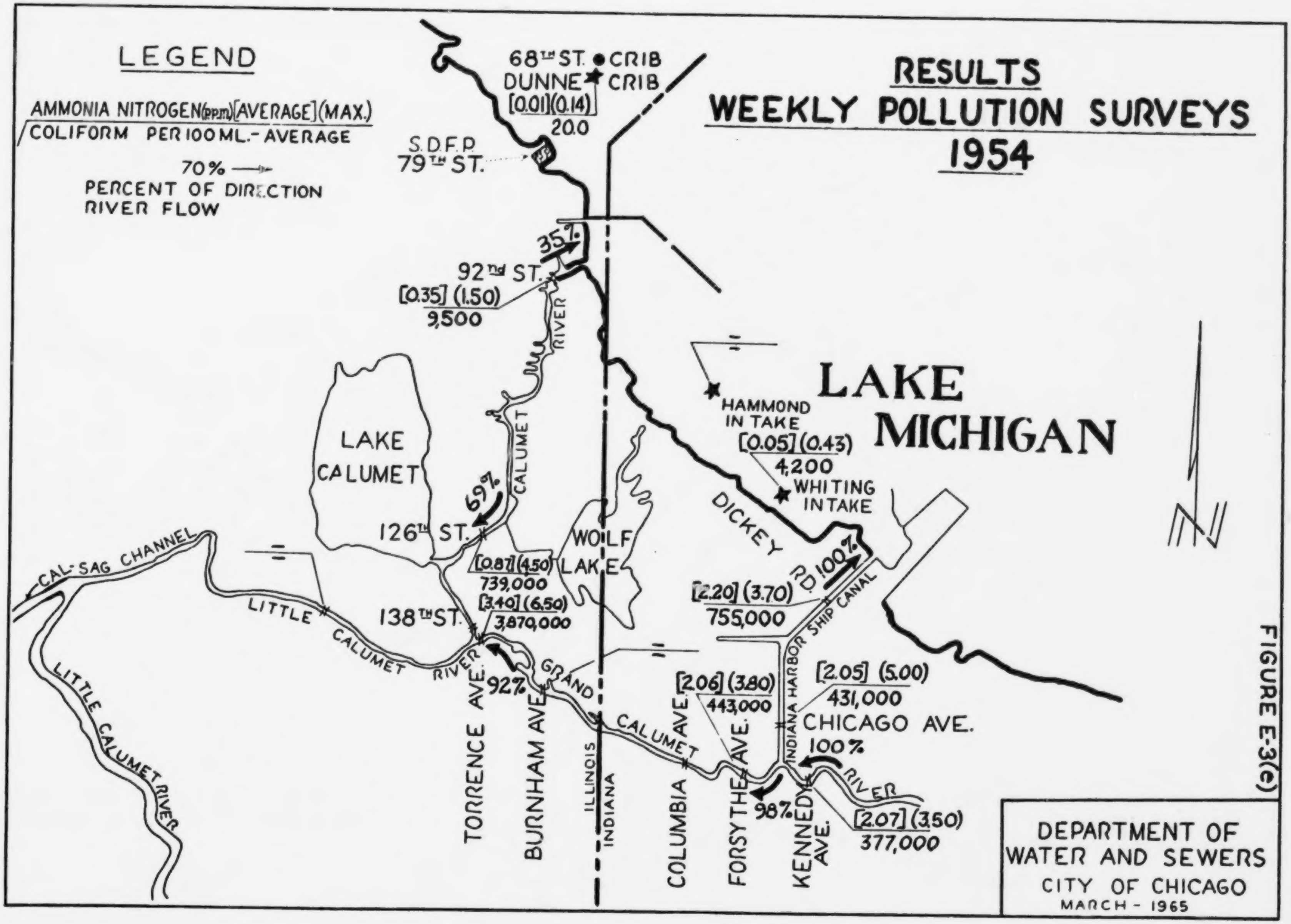
70% →
PERCENT OF DIRECTION
RIVER FLOW

68TH ST. ● CRIB
DUNNE ★ CRIB
[0.01](0.12)
13.9
S.D.F.P.
79TH ST.
92ND ST.
54%
[0.41](2.00)
7,800
RIVER
CALUMET
LAKE CALUMET
51%
126TH ST.
[1.92](6.50)
1,440,000
WOLF LAKE
138TH ST.
[4.22](7.50)
2,860,000
71%
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
LITTLE CALUMET RIVER
GRAND CALUMET
TORRENCE AVE
BURNHAM AVE
ILLINOIS
INDIANA
COLUMBIA AVE
[2.54](5.50)
2,020,000
FORSYTHE AVE
96%
KENNEDY AVE.
100%
RIVER
[2.35](5.20)
362,000
[2.54](4.80)
657,000
CHICAGO AVE.
INDIANA HARBOR SHIP CANAL
[3.26](15.00)
268,000
100%
DICKEY RD.
HAMMOND INTAKE
WHITING INTAKE
LAKE MICHIGAN
N

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

RESULTS WEEKLY POLLUTION SURVEYS 1954

FIGURE E-3(c)


LEGEND
AMMONIA NITROGEN(ppm)[AVERAGE](MAX.)
COLIFORM PER 100 ML.- AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68th ST. ● CRIB
DUNNE ★ CRIB
[0.01](0.14)
20.0
S.D.F.P.
79th ST.
35%
92nd ST.
[0.35] (1.50)
9,500
LAKE MICHIGAN
HAMMOND IN TAKE
[0.05] (0.43)
4,200
WHITING INTAKE
DICKEY RD.
100%
LAKE CALUMET
CALUMET RIVER
69%
126th ST.
WOLF LAKE
[0.87](4.50)
739,000
138th ST.
[3.40] (6.50)
3,870,000
[2.20] (3.70)
755,000
INDIANA HARBOR SHIP CANAL
[2.05] (5.00)
431,000
CHICAGO AVE.
100%
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
LITTLE CALUMET RIVER
92%
GRAND CALUMET RIVER
[2.06] (3.80)
443,000
98%
[2.07] (3.50)
377,000
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
KENNEDY AVE.

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

RESULTS
WEEKLY POLLUTION SURVEYS
1955

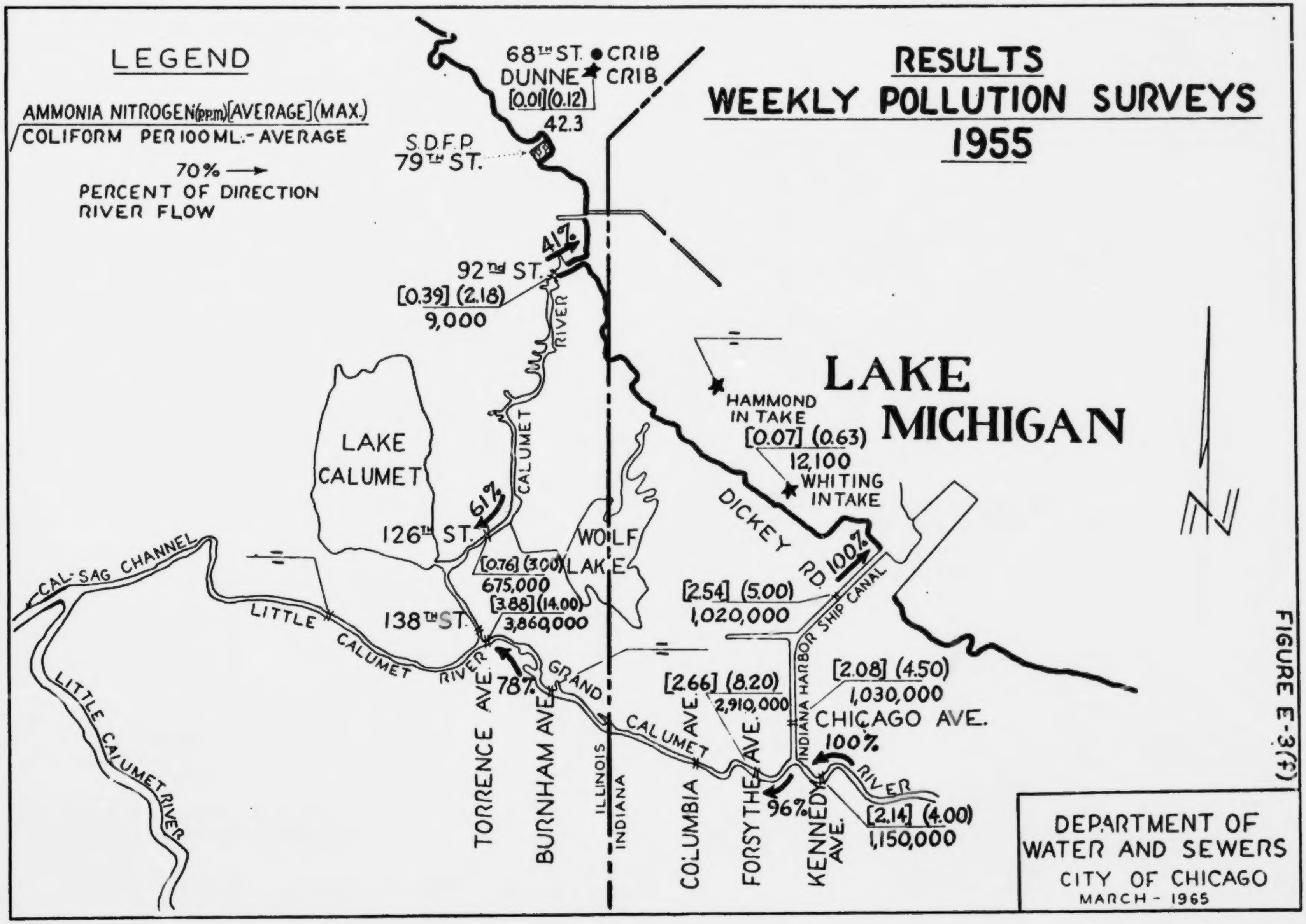
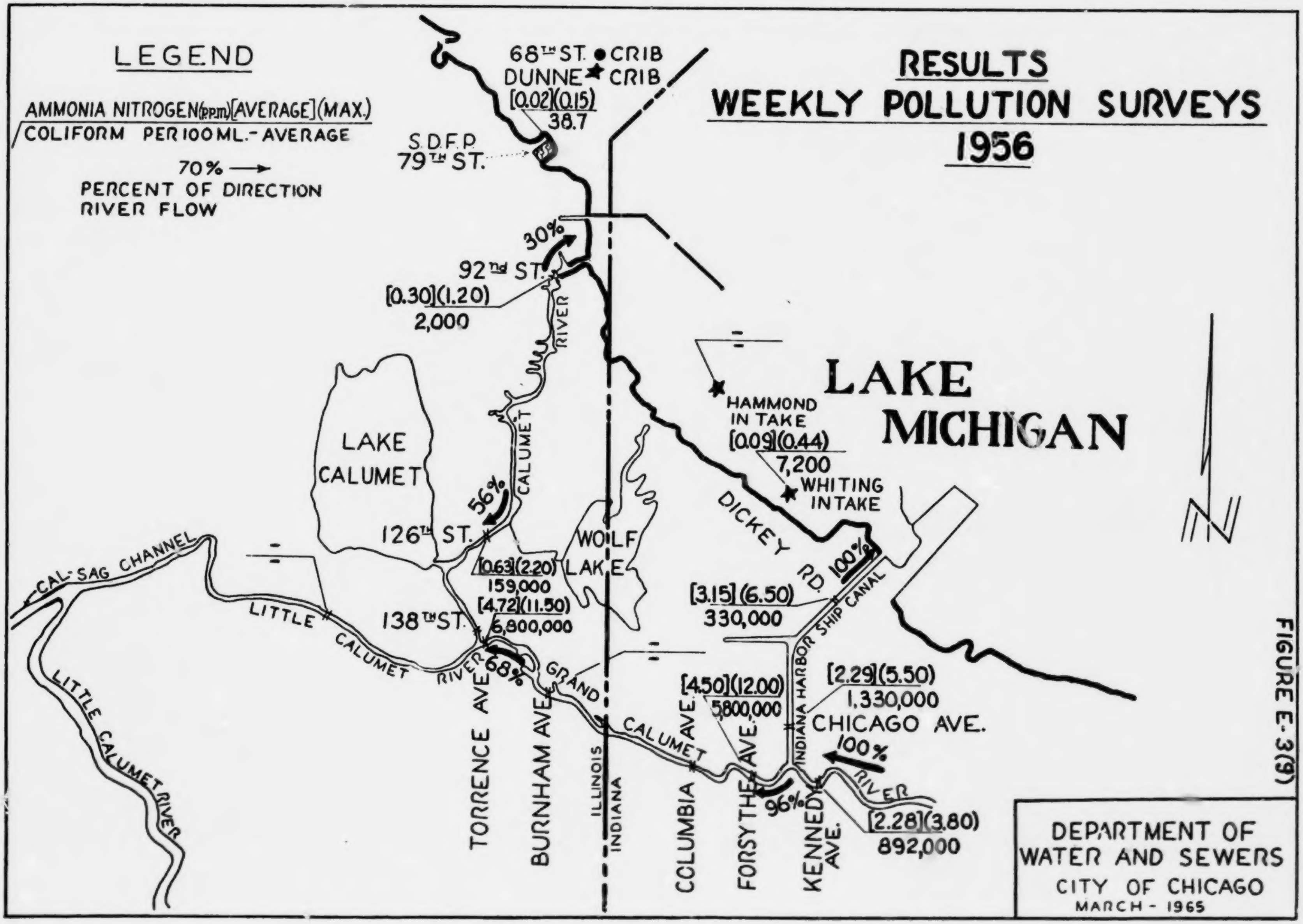

LEGEND
AMMONIA NITROGEN(p.p.m.)[AVERAGE](MAX.)
COLIFORM PER 100 ML. - AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. CRIB
DUNNE CRIB
[0.01] (0.12)
42.3
S.D.F.P. 79TH ST.
41%
92ND ST.
[0.39] (2.18)
9,000
LAKE MICHIGAN
HAMMOND IN TAKE
[0.07] (0.63)
12,100
WHITING INTAKE
LAKE CALUMET
CALUMET RIVER
61%
126TH ST.
[0.76] (3.00)
675,000
WOLF LAKE
DICKEY RD.
100%
[2.54] (5.00)
1,020,000
INDIANA HARBOR SHIP CANAL
138TH ST.
[3.88] (14.00)
3,860,000
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
LITTLE CALUMET RIVER
78%
GRAND CALUMET RIVER
[2.66] (8.20)
2,910,000
[2.08] (4.50)
1,030,000
CHICAGO AVE.
100%
96%
[2.14] (4.00)
1,150,000
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
KENNEDY AVE.
N

FIGURE E-3(f)

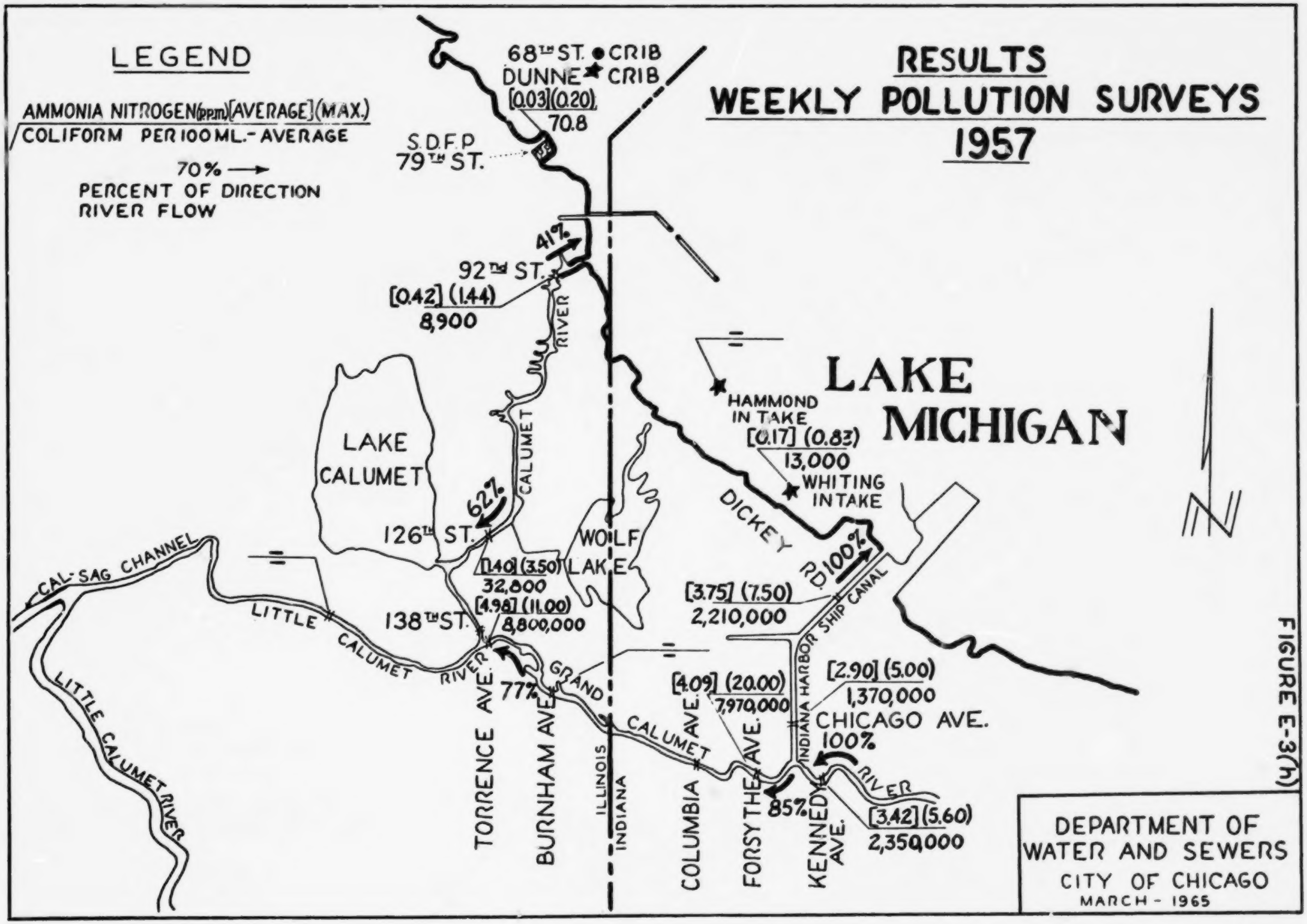
DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

FIGURE E-3(9)

RESULTS
WEEKLY POLLUTION SURVEYS
1956


LEGEND
AMMONIA NITROGEN (p.p.m.) [AVERAGE] (MAX.)
COLIFORM PER 100 ML. - AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. ● CRIB
DUNNE ★ CRIB
[0.02](0.15)
38.7
S.D.F.P. 79TH ST.
30%
92ND ST.
[0.30](1.20)
2,000
LAKE MICHIGAN
HAMMOND IN TAKE
[0.09](0.44)
7,200
WHITING INTAKE
LAKE CALUMET
CALUMET RIVER
56%
126TH ST.
[0.63](2.20)
159,000
WOLF LAKE
DICKEY RD.
100%
[3.15](6.50)
330,000
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
138TH ST.
[4.72](11.50)
6,800,000
68%
GRAND CALUMET RIVER
INDIANA HARBOR SHIP CANAL
[4.50](12.00)
5,800,000
[2.29](5.50)
1,330,000
CHICAGO AVE.
100%
96%
[2.28](3.80)
892,000
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
KENNEDY AVE.
LITTLE CALUMET RIVER
N

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965



RESULTS
WEEKLY POLLUTION SURVEYS
1957

FIGURE E-3(h)

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

LEGEND
AMMONIA NITROGEN(P.P.M.)[AVERAGE](MAX.)
COLIFORM PER 100 ML.-AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. CRIB
DUNNE CRIB
[0.03](0.20)
70.8
S.D.F.P.
79TH ST.
41%
92ND ST.
[0.42] (1.44)
8,900
LAKE MICHIGAN
HAMMOND INTAKE
[0.17] (0.83)
13,000
WHITING INTAKE
DICKEY RD.
100%
LAKE CALUMET
CALUMET RIVER
62%
126TH ST.
WOLF LAKE
[1.40](3.50)
32,800
[4.98](11.00)
8,800,000
138TH ST.
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
LITTLE CALUMET RIVER
77%
GRAND CALUMET RIVER
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
KENNEDY AVE.
85%
[3.75] (7.50)
2,210,000
INDIANA HARBOR SHIP CANAL
[4.09] (20.00)
7,970,000
[2.90] (5.00)
1,370,000
CHICAGO AVE.
100%
[3.42] (5.60)
2,350,000
N

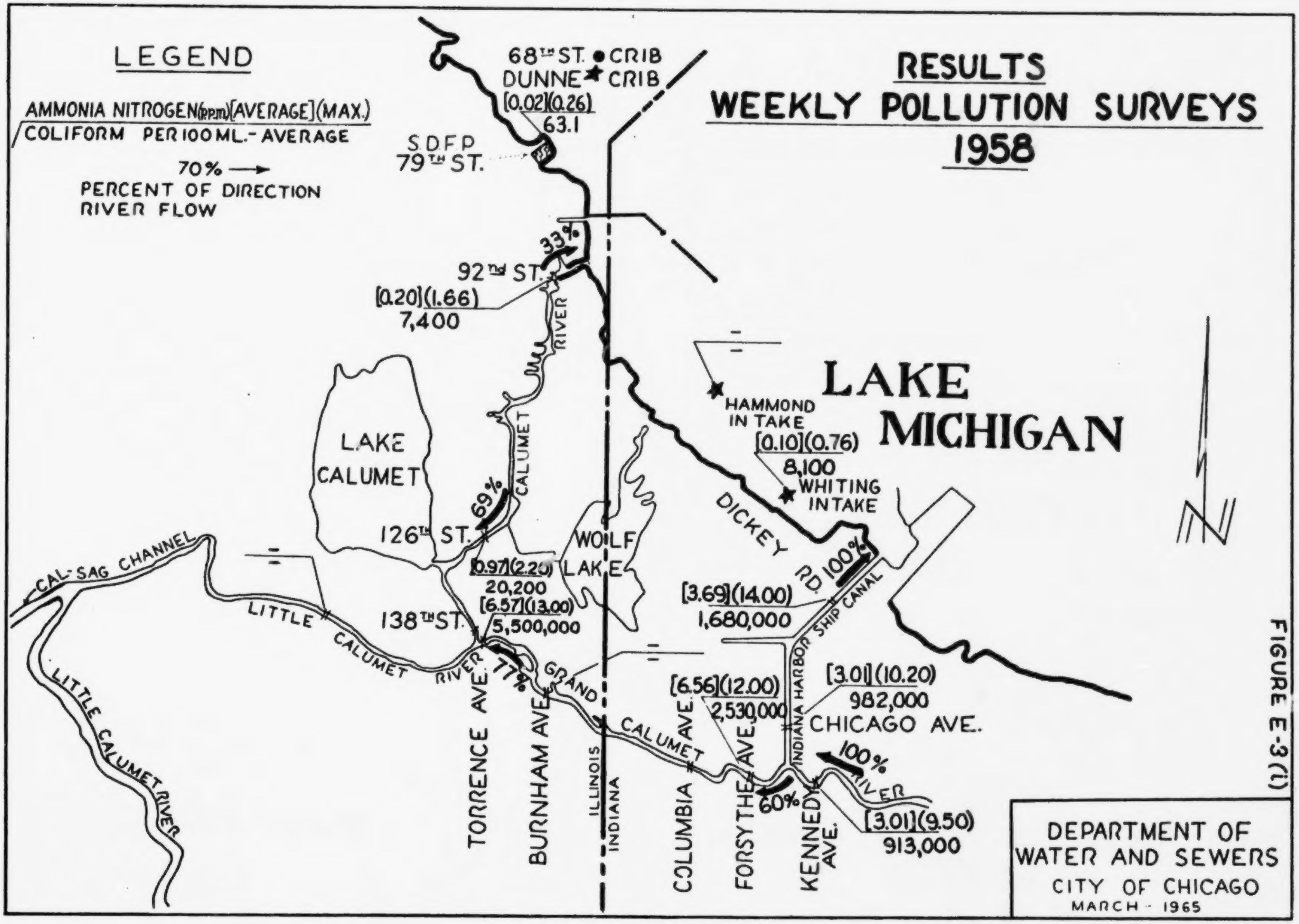

LEGEND
AMMONIA NITROGEN(P.P.M.)[AVERAGE](MAX.)
COLIFORM PER 100 ML.-AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. ● CRIB
DUNNE ★ CRIB
[0.02](0.26)
63.1
S.D.F.P. 79TH ST.
33%
92ND ST.
[0.20](1.66)
7,400
LAKE MICHIGAN
HAMMOND IN TAKE
[0.10](0.76)
8,100
WHITING IN TAKE
LAKE CALUMET
CALUMET RIVER
69%
126TH ST.
WOLF LAKE
DICKEY RD.
100%
[0.97](2.20)
20,200
[6.57](13.00)
5,500,000
138TH ST.
[3.69](14.00)
1,680,000
INDIANA HARBOR SHIP CANAL
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
77%
GRAND CALUMET RIVER
[6.56](12.00)
2,530,000
[3.01](10.20)
982,000
CHICAGO AVE.
100%
LITTLE CALUMET RIVER
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
60%
KENNEDY AVE.
[3.01](9.50)
913,000
N

FIGURE E-3 (i)

RESULTS
WEEKLY POLLUTION SURVEYS
1958

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

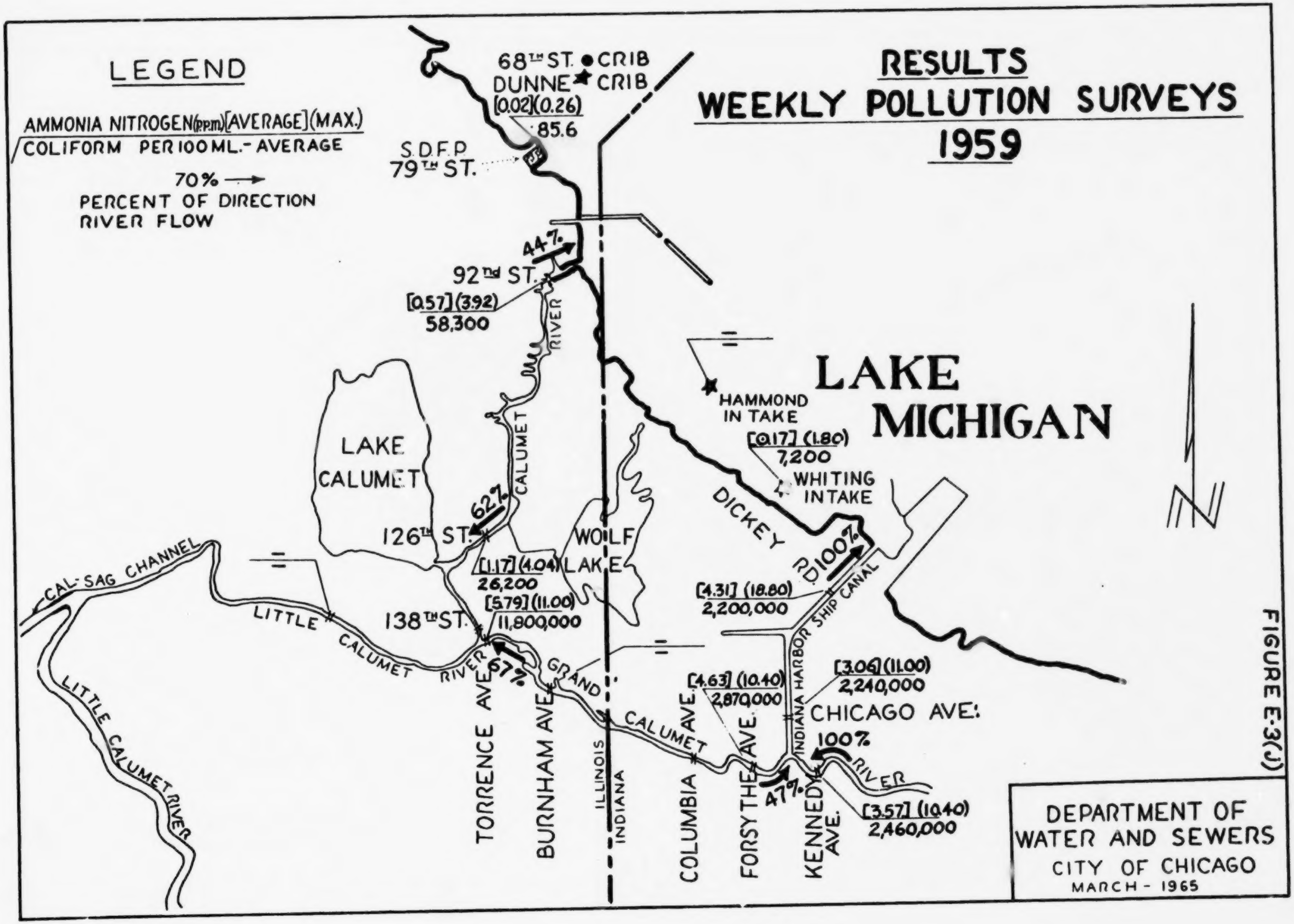


FIGURE E-3(J)

RESULTS WEEKLY POLLUTION SURVEYS 1959

LEGEND
AMMONIA NITROGEN(p.p.m.)[AVERAGE](MAX.)
COLIFORM PER 100 ML.- AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. CRIB
DUNNE CRIB
[0.02](0.26)
85.6
S.D.F.P. 79TH ST.
44%
92ND ST.
[0.57](3.92)
58,300
LAKE MICHIGAN
HAMMOND IN TAKE
[0.17](1.80)
7,200
WHITING INTAKE
DICKEY RD.
100%
LAKE CALUMET
62%
126TH ST.
CALUMET RIVER
WOLF LAKE
[1.17](4.04)
26,200
[5.79](11.00)
11,800,000
138TH ST.
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
67%
TORRENCE AVE.
BURNHAM AVE.
GRAND CALUMET
ILLINOIS
INDIANA
COLUMBIA AVE.
[4.63](10.40)
2,870,000
FORSYTHE AVE.
47%
KENNEDY AVE.
[4.31](18.80)
2,200,000
INDIANA HARBOR SHIP CANAL
[3.06](11.00)
2,240,000
CHICAGO AVE.
100%
RIVER
[3.57](10.40)
2,460,000
LITTLE CALUMET RIVER
N

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

RESULTS
WEEKLY POLLUTION SURVEYS
1960

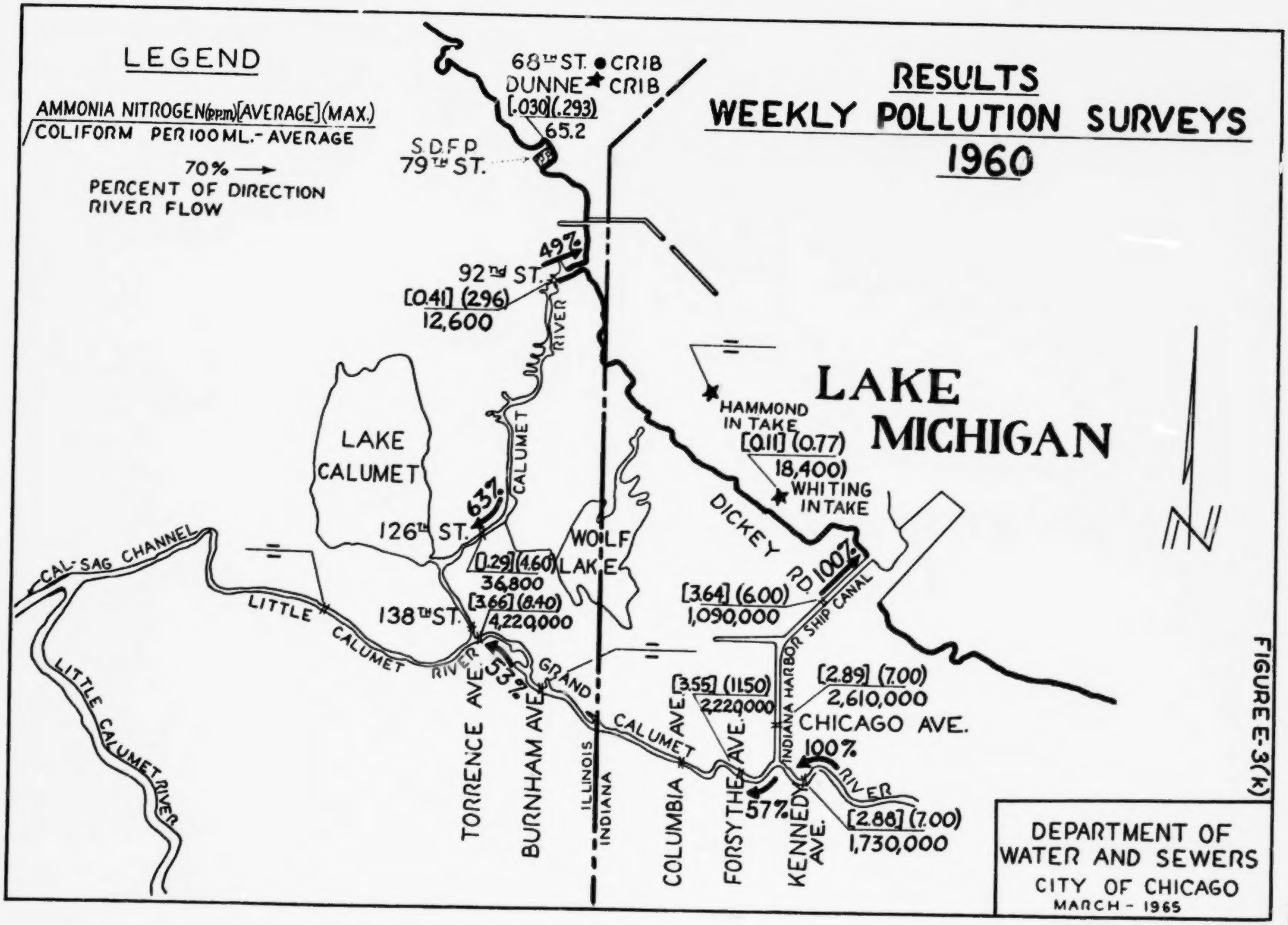
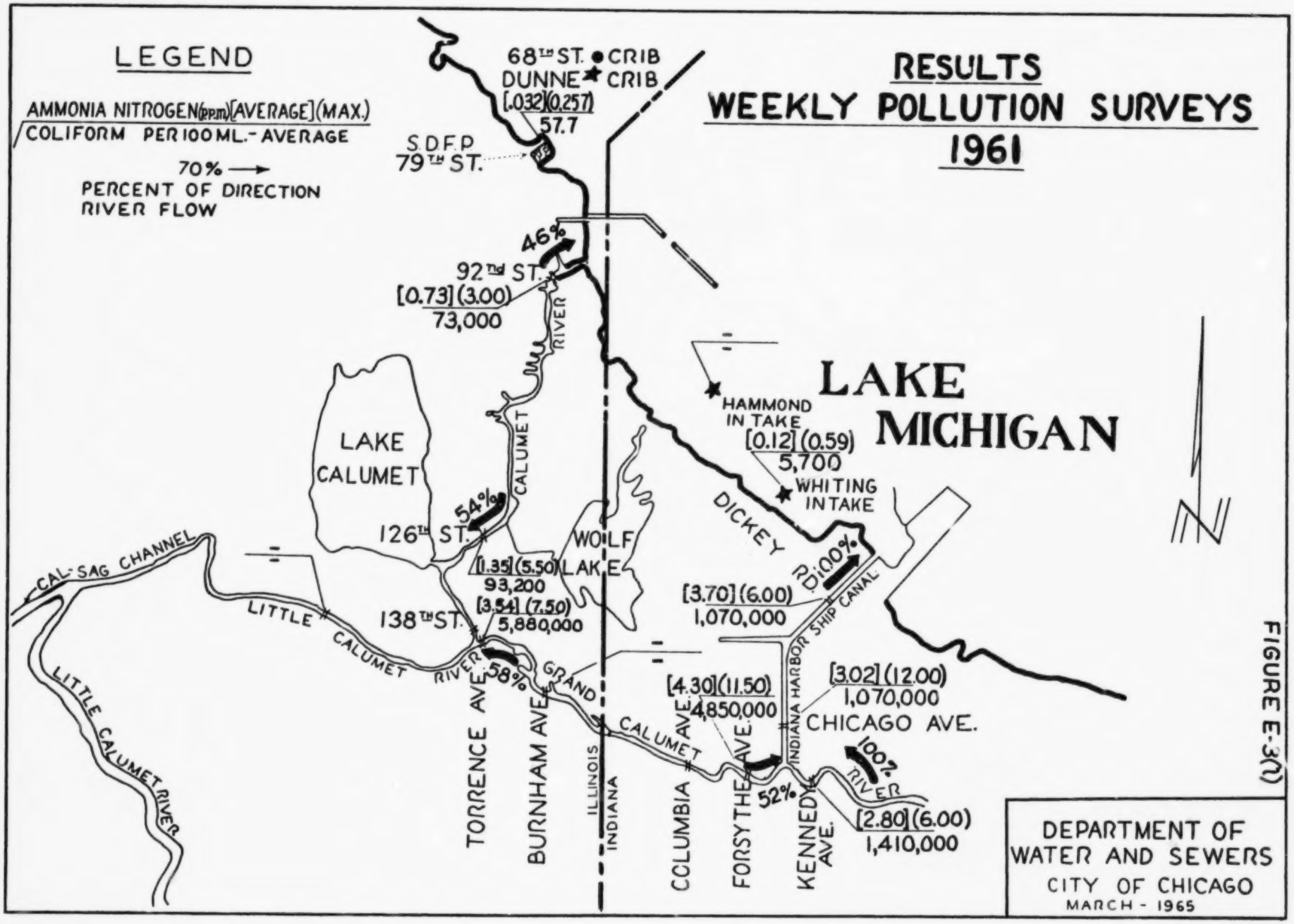

LEGEND
AMMONIA NITROGEN(ppm)[AVERAGE](MAX.)
COLIFORM PER 100 ML.- AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68th ST. ● CRIB
DUNNE ★ CRIB
[.030](.293)
65.2
S.D.F.P.
79th ST.
49%
92nd ST.
[0.41] (2.96)
12,600
RIVER
CALUMET
LAKE CALUMET
63%
126th ST.
[1.29] (4.60)
36,800
WOLF LAKE
[3.66] (8.40)
4,220,000
138th ST.
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
LITTLE CALUMET RIVER
53%
GRAND
CALUMET
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
[3.55] (11.50)
2,220,000
57%
KENNEDY AVE.
[2.88] (7.00)
1,730,000
RIVER
100%
CHICAGO AVE.
[2.89] (7.00)
2,610,000
INDIANA HARBOR SHIP CANAL
[3.64] (6.00)
1,090,000
100%
DICKEY RD.
HAMMOND INTAKE
[0.11] (0.77)
18,400)
WHITING INTAKE
LAKE MICHIGAN
N

FIGURE E-3(k)

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

FIGURE E-3(1)

RESULTS
WEEKLY POLLUTION SURVEYS
1961


LEGEND
AMMONIA NITROGEN(p.p.m.)[AVERAGE](MAX.)
COLIFORM PER 100 ML.- AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
LAKE MICHIGAN
68TH ST. CRIB
DUNNE CRIB
[.032](0.257)
57.7
S.D.F.P.
79TH ST.
46%
92ND ST.
[0.73](3.00)
73,000
RIVER
CALUMET
LAKE CALUMET
54%
126TH ST.
[1.35](5.50)
93,200
WOLF LAKE
138TH ST.
[3.54](7.50)
5,880,000
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
LITTLE CALUMET RIVER
58%
GRAND CALUMET
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
[4.30](11.50)
4,850,000
52%
KENNEDY AVE.
RIVER
100%
[2.80](6.00)
1,410,000
CHICAGO AVE.
[3.02](12.00)
1,070,000
INDIANA HARBOR SHIP CANAL
DICKEY RD.
100%
[3.70](6.00)
1,070,000
HAMMOND INTAKE
[0.12](0.59)
5,700
WHITING INTAKE
N

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

RESULTS
WEEKLY POLLUTION SURVEYS
1962

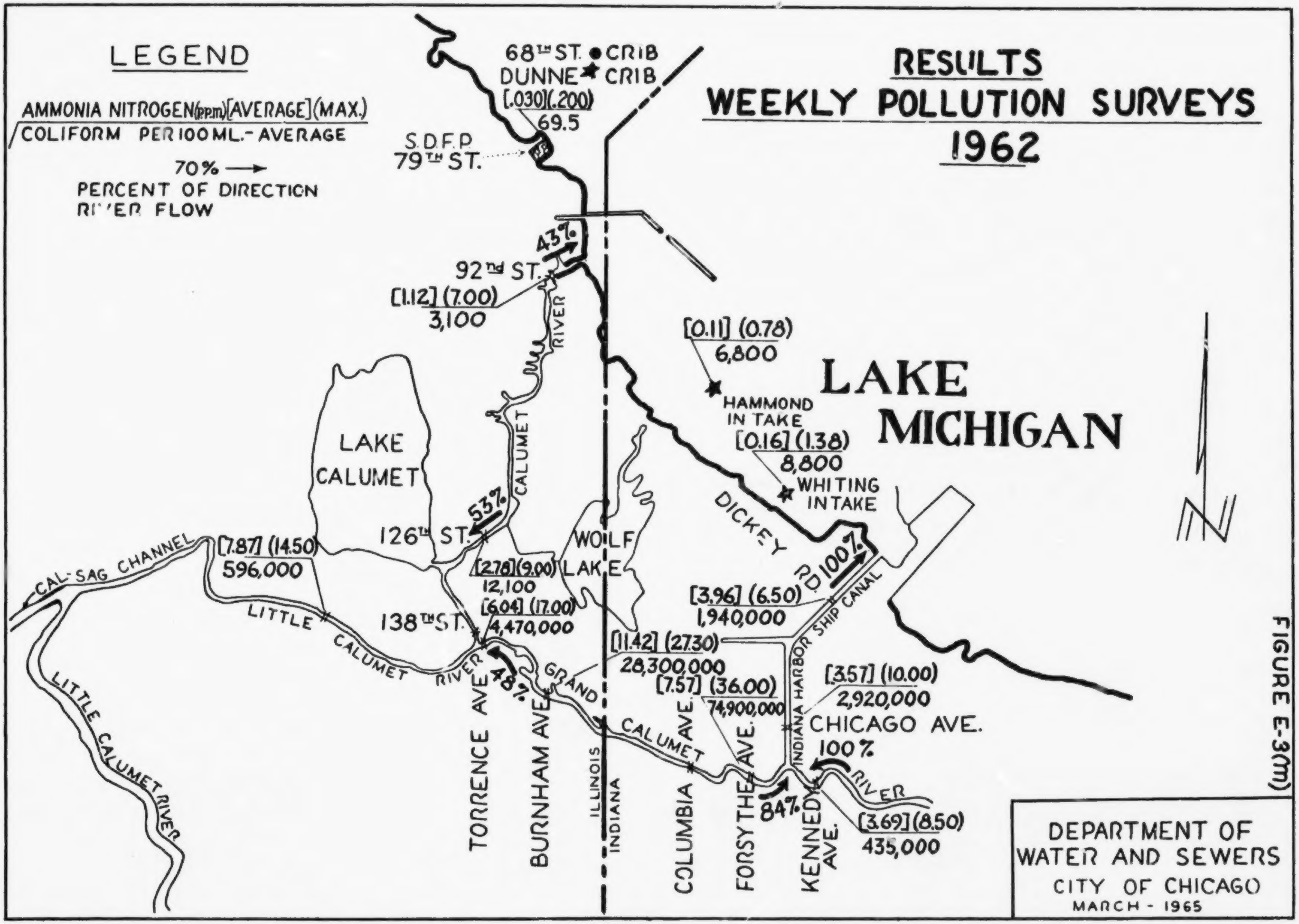
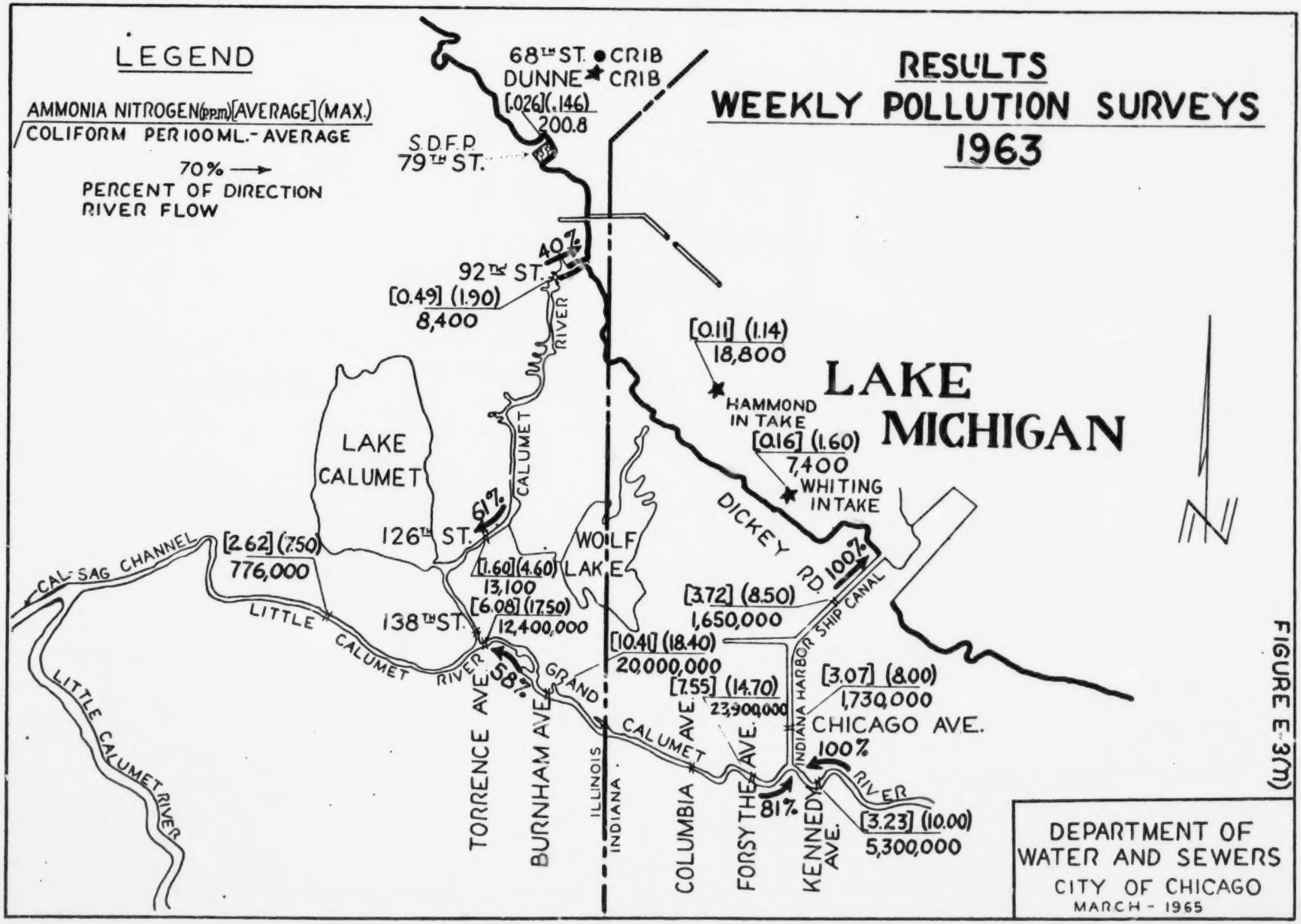

LEGEND
AMMONIA NITROGEN(ppm)[AVERAGE](MAX.)
COLIFORM PER 100 ML.- AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. ● CRIB
DUNNE ★ CRIB
[.030](.200)
69.5
S.D.F.P. 79TH ST.
43%
92nd ST.
[1.12] (7.00)
3,100
RIVER
CALUMET
LAKE CALUMET
53%
126TH ST.
[7.87] (14.50)
596,000
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
[2.78](9.00)
12,100
WOLF LAKE
138TH ST.
[6.04] (17.00)
4,470,000
LITTLE CALUMET RIVER
48%
TORRENCE AVE
BURNHAM AVE
GRAND
ILLINOIS
INDIANA
CALUMET
COLUMBIA AVE.
FORSYTHE AVE.
[11.42] (27.30)
28,300,000
[7.57] (36.00)
74,900,000
84%
KENNEDY AVE.
RIVER
[3.69] (8.50)
435,000
100%
CHICAGO AVE.
[3.57] (10.00)
2,920,000
INDIANA HARBOR SHIP CANAL
[3.96] (6.50)
1,940,000
DICKEY RD.
100%
[0.11] (0.78)
6,800
HAMMOND IN TAKE
[0.16] (1.38)
8,800
WHITING INTAKE
LAKE MICHIGAN
N

FIGURE E-3(m)

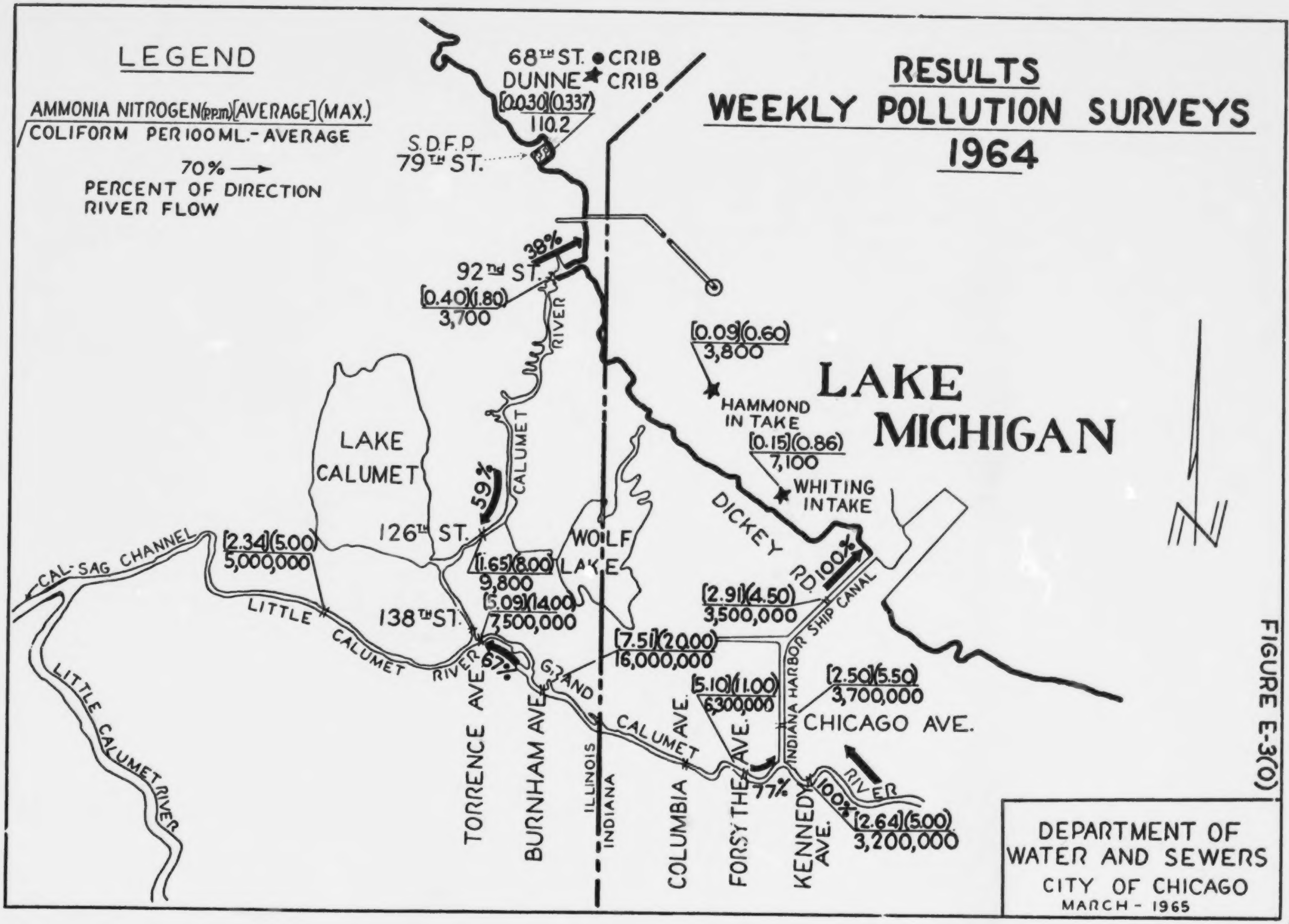
DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

FIGURE E-3(m)

RESULTS
WEEKLY POLLUTION SURVEYS
1963


LEGEND
AMMONIA NITROGEN(ppm)[AVERAGE](MAX.)
COLIFORM PER 100 ML.- AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. ● CRIB
DUNNE ★ CRIB
[.026](.146)
200.8
S.D.F.P. 79TH ST.
40%
92ND ST.
[0.49] (1.90)
8,400
[0.11] (1.14)
18,800
HAMMOND IN TAKE
LAKE MICHIGAN
[0.16] (1.60)
7,400
WHITING INTAKE
LAKE CALUMET
CALUMET RIVER
61%
126TH ST.
[1.60](4.60)
13,100
WOLF LAKE
DICKEY RD.
100%
[3.72] (8.50)
1,650,000
INDIANA HARBOR SHIP CANAL
[2.62] (7.50)
776,000
CAL-SAG CHANNEL
LITTLE CALUMET RIVER
138TH ST.
[6.08] (17.50)
12,400,000
[10.41] (18.40)
20,000,000
[7.55] (14.70)
23,900,000
[3.07] (8.00)
1,730,000
CHICAGO AVE.
100%
GRAND CALUMET RIVER
58%
81%
[3.23] (10.00)
5,300,000
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
KENNEDY AVE.
N

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965



RESULTS
WEEKLY POLLUTION SURVEYS
1964

LEGEND
AMMONIA NITROGEN(p.p.m.)[AVERAGE](MAX.)
COLIFORM PER 100 ML.-AVERAGE
70% →
PERCENT OF DIRECTION RIVER FLOW
68TH ST. ● CRIB
DUNNE ★ CRIB
[0.030](0.337)
110.2
S.D.F.P. 79TH ST.
38%
92ND ST.
[0.40](1.80)
3,700
[0.09](0.60)
3,800
HAMMOND IN TAKE
LAKE MICHIGAN
[0.15](0.86)
7,100
WHITING INTAKE
LAKE CALUMET
CALUMET RIVER
59%
126TH ST.
WOLF LAKE
DICKEY RD.
100%
[2.34](5.00)
5,000,000
CAL-SAG CHANNEL
[1.65](8.00)
9,800
[5.09](14.00)
7,500,000
[2.91](4.50)
3,500,000
LITTLE CALUMET RIVER
138TH ST.
67%
GRAND CALUMET
[7.51](20.00)
16,000,000
INDIANA HARBOR SHIP CANAL
[5.10](11.00)
6,300,000
[2.50](5.50)
3,700,000
CHICAGO AVE.
LITTLE CALUMET RIVER
TORRENCE AVE.
BURNHAM AVE.
ILLINOIS
INDIANA
COLUMBIA AVE.
FORSYTHE AVE.
77%
KENNEDY AVE.
100%
RIVER
[2.64](5.00)
3,200,000
N

FIGURE E-3(O)

DEPARTMENT OF
WATER AND SEWERS
CITY OF CHICAGO
MARCH - 1965

100 per cent and also at the junction of the Grand Calumet River and the Indiana Harbor Ship Canal. We show the percentage as well as the percentage where the Grand Calumet River enters the Little Calumet River toward the Sag-Channel.

Next slide.

This is the last year on our records, 1964. I think the results can be shown much better by showing the data in chart form and this chart shows the average coliform at Dickey Road which is the upper part of the graph and which shows the character of the water flowing into the lake from the Indiana Harbor Ship Canal, which shows a generally upward trend since 1950 to 1964, and the average at the 92nd Street bridge which is the lower line, which represents the water near the mouth of the Calumet River. (See Fig. E-4 on following page)

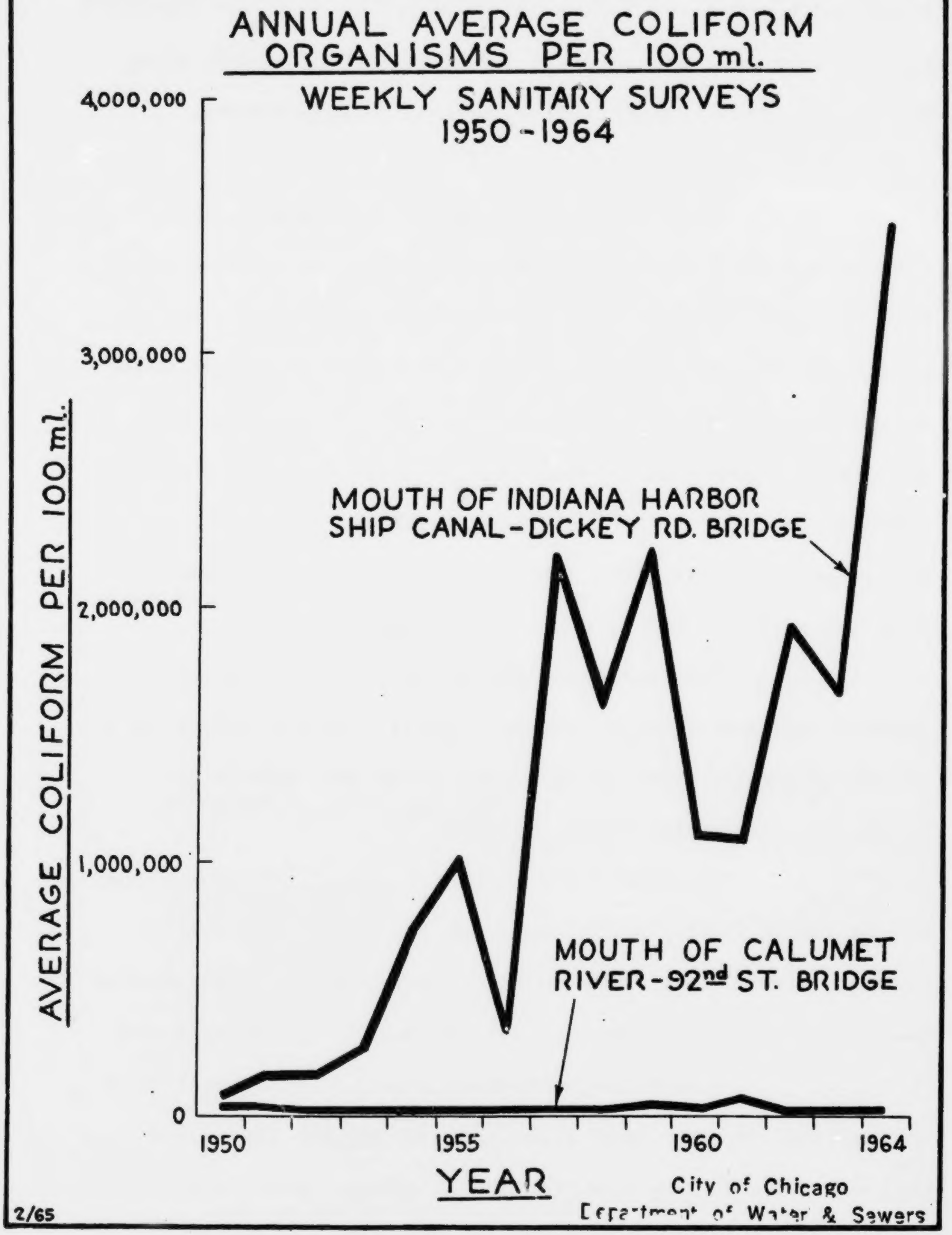
The next slide shows similarly the amount of ammonia nitrogen average, yearly figures, for the Dickey Road at the ship canal and the lower one shows the 92nd Street bridge on the Calumet River. (See Fig. E-5 on following page)

The next slide shows the phenol determinations on the Indiana Harbor Ship Canal and the lower one is the Calumet River. There's a greater fluctuation in these results than in some of the others. (See Fig. E-6 on following page)

I have one more slide that I haven't mentioned in the text, but the next slide shows a typical lake survey that our Water Safety Control Section makes. This is on

(Continue text on page 436)

FIGURE E-4

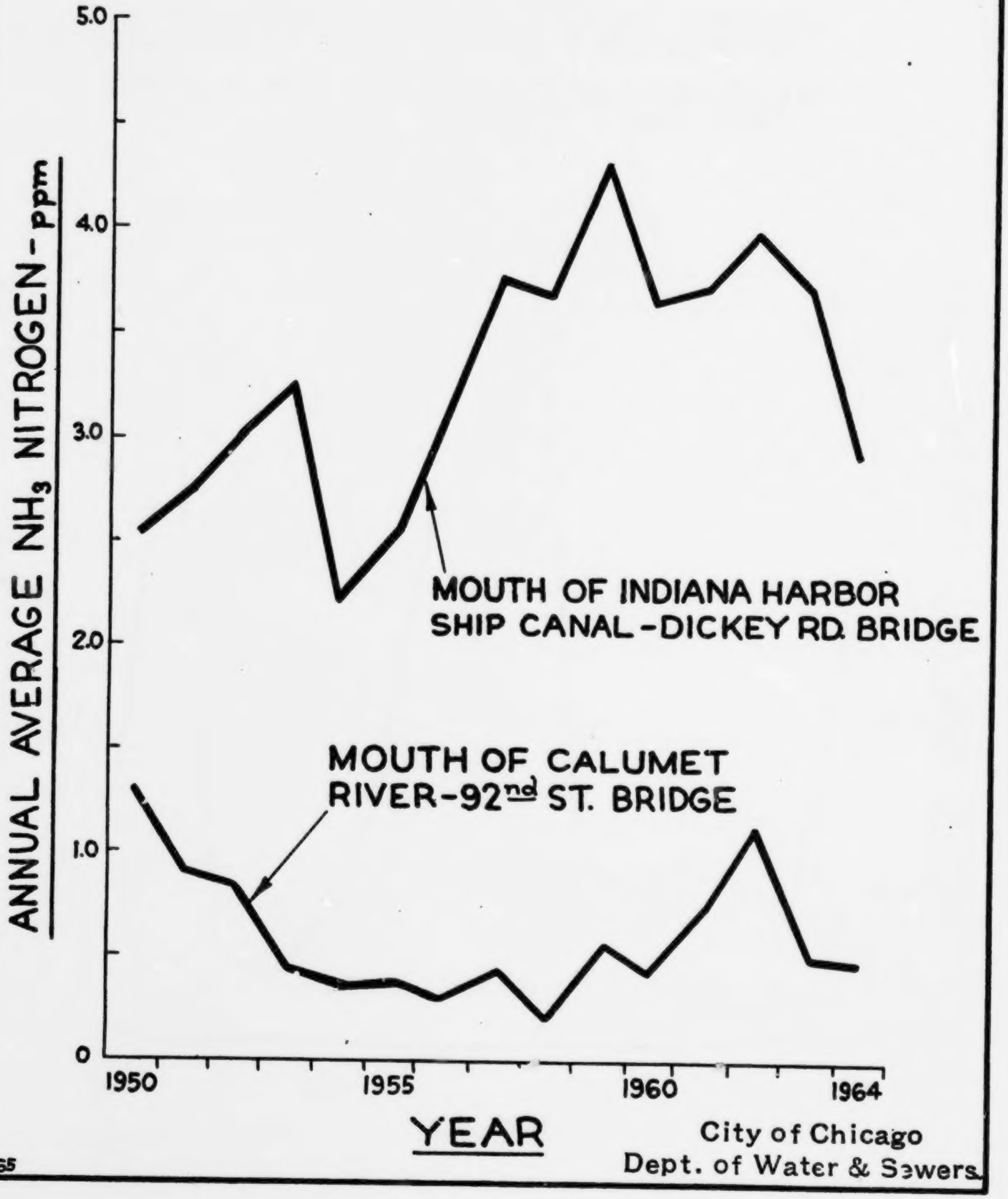


City of Chicago
Department of Water & Sewers

2/65

FIGURE E-5

ANNUAL AVERAGE AMMONIA NITROGEN
WEEKLY SANITARY SURVEYS
1950-1964



2/65

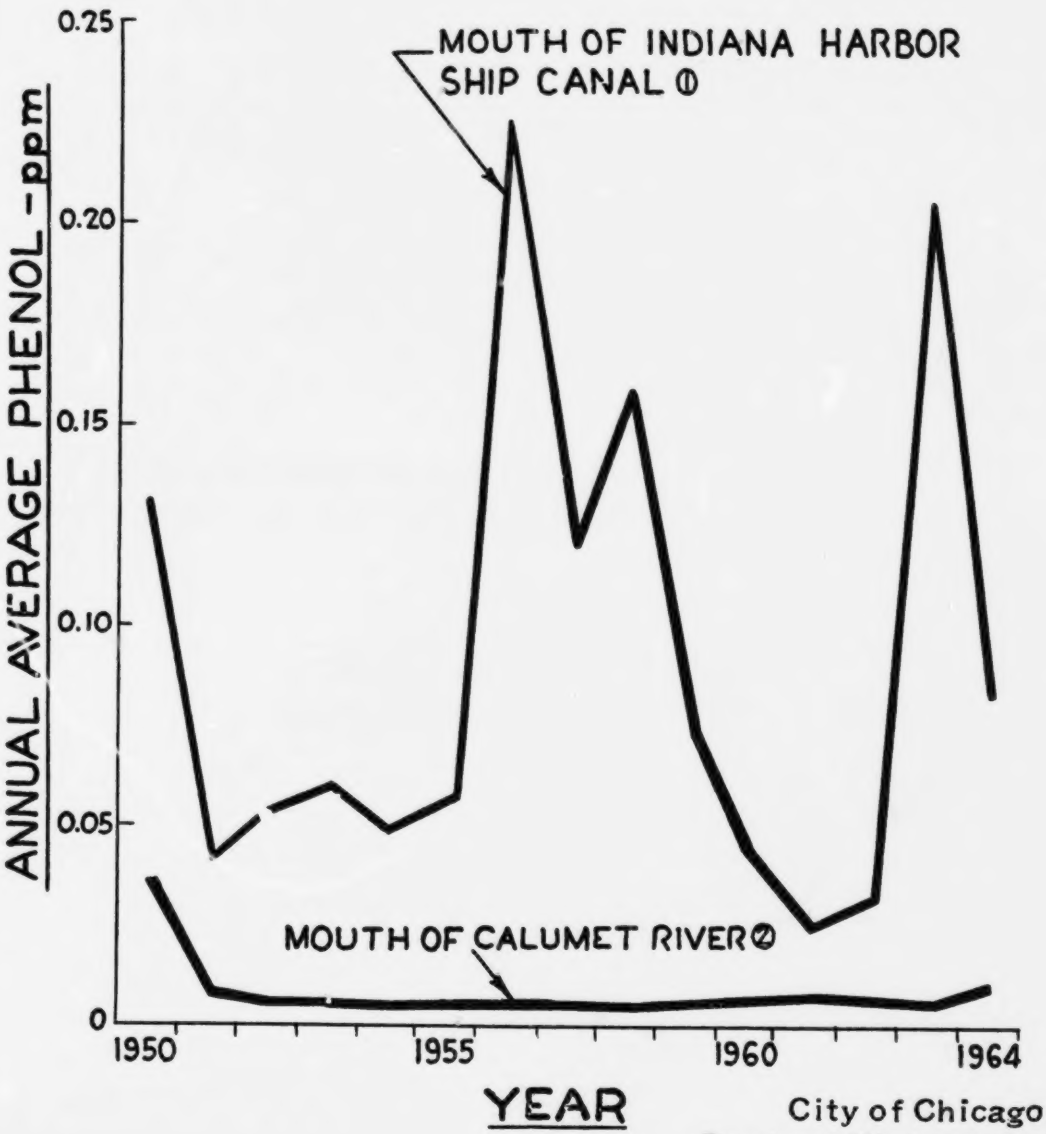
City of Chicago
Dept. of Water & Sewers

FIGURE E-6

ANNUAL AVERAGE PHENOL
WEEKLY SANITARY SURVEYS
1950-1964

① INDIANA HARBOR SHIP CANAL SAMPLING AT CANAL ST. BRIDGE (1950-1959) AND DICKEY RD. BRIDGE (1960-1964)

② CALUMET RIVER SAMPLING AT 92nd ST. BRIDGE (1950-1964)



City of Chicago
Dept. of Water & Sewers

December 14, 1964. (See Fig. E-7 on following page.)

I don't know if you can see but the results are shown in the lower left-hand corner but it shows that the .6 at the mouth of the Indiana Harbor Ship Canal -- it has got the highest figures in ammonia nitrogen and coliform and progressively the amounts get less as you go from 6, 5, 4, 3, 2, 1, up to the intake on -- the Dunne intake on the top.

The next slide, please.

The next section is on lake currents carrying slugs of pollution to intakes.

I hope you will bear with me in this section. We tried to follow various slugs of pollution carried by the winds to just give you an idea of how the pollution is carried long distances in the lake under the influence of lake currents.

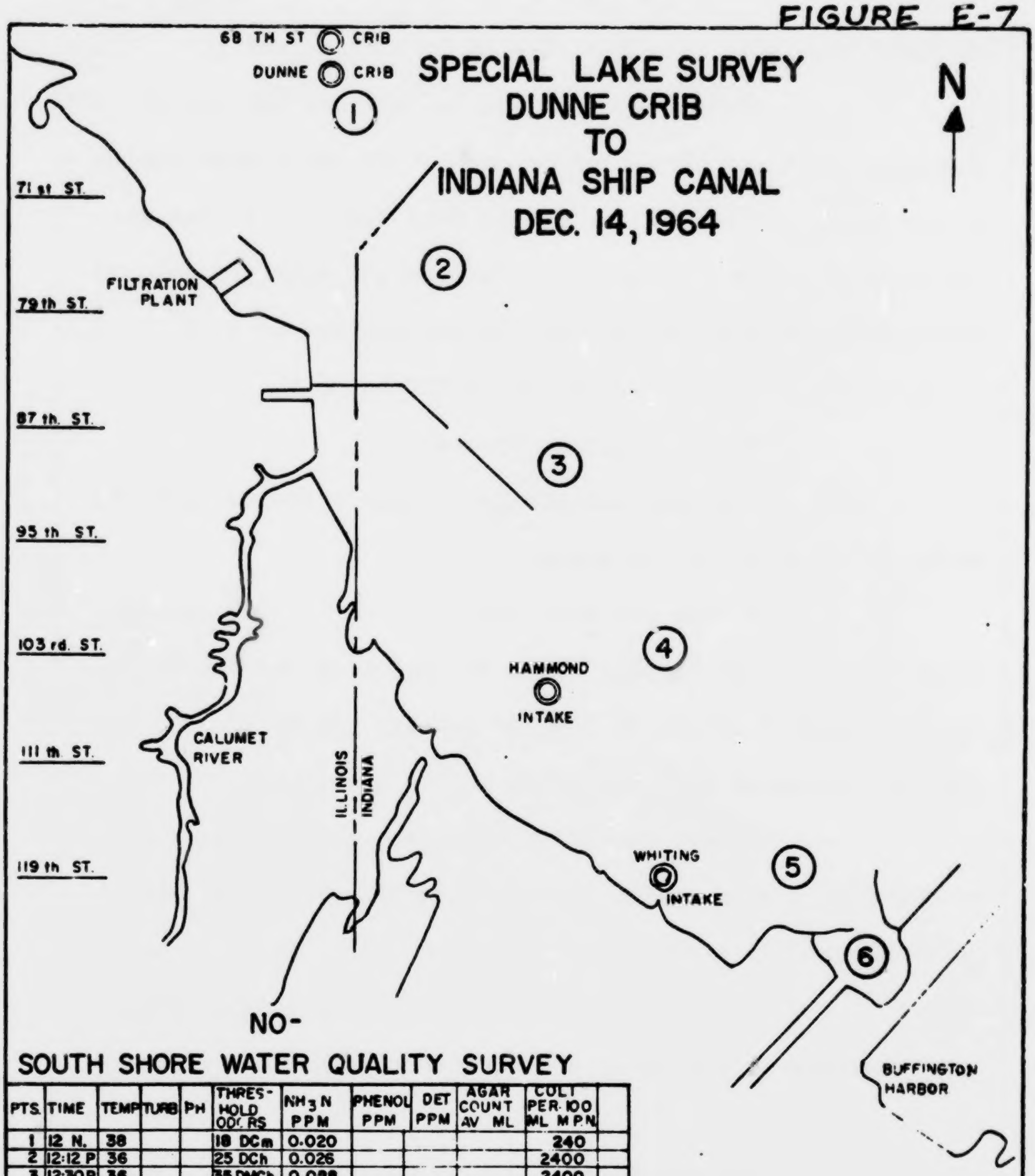
Experience and observation made in the course of day-by-day supervision over the quality of the Chicago water supply has produced ample evidence that polluted water drifts in slugs or pools which are carried by wind-induced lake currents in the general direction of the winds existing at the time.

The travel of the lake currents bears a direct relationship to wind direction and velocity. The distance that slugs or pools of pollution are carried in the lake are dependent upon the total hours that the wind is sustained in a given direction.

(Continue text on page 438)

FIGURE E-7

SPECIAL LAKE SURVEY DUNNE CRIB TO INDIANA SHIP CANAL DEC. 14, 1964


68 TH ST CRIB
DUNNE CRIB
①
N
71 st ST.
79 th ST.
FILTRATION PLANT
②
87 th. ST.
③
95 th ST.
103 rd. ST.
④
HAMMOND INTAKE
111 th ST.
CALUMET RIVER
ILLINOIS
INDIANA
119 th ST.
WHITING INTAKE
⑤
⑥
NO-
BUFFINGTON HARBOR

SOUTH SHORE WATER QUALITY SURVEY

PTS.	TIME	TEMP	TURB	PH	THRES-HOLD ODORS	NH_3 N PPM	PHENOL PPM	DET PPM	AGAR COUNT AV ML	COLI PER 100 ML M.P.N.	
1	12 N.	38			18 DCm	0.020				240	
2	12:12 P	36			25 DCh	0.026				2400	
3	12:30 P	36			35 DMCh	0.088				2400	
4	12:45 P	37			20 DM	0.108				2400	
5	1:00 P	38			25 DCh	0.096				24000	
6	1:05 P	48			40 DCh	1.730				240,000	

CITY OF CHICAGO
DEPARTMENT OF WATER & SEWERS

DIRECTION WNW VELOCITY 22 MPH

REMARKS

PT. 6 WATER WAS BROWN

BY G. GATTO S.E. I DATE 12-14-64
S. KOSTKA LAB.

These conclusions are borne out by analyses of many pollution incidents which have been observed each year since close supervision over the water quality and safety began in 1924. Further confirmation of wind-induced lake currents is offered by the results of a series of float travel tests made by the Water Safety Control Section in 1925 and 1926, under my direction, as well as the most recent comprehensive current studies made by the United States Public Health Service Great Lakes-Illinois River Basin (GLIRB) Project.

An illustration of the movement of pollution pools under the influence of wind-induced lake currents which were experienced in the fall of 1961 was a series of tests and odor incidents at Chicago's water intakes.

These show in a striking manner how far pools of pollution have traveled in the lake. During the period of September 15 to November 15, 1961, at the Dunne Crib and shore intakes supplying the South District Filtration Plant, there were 8 periods of taste and odor incidents. Some of these lasted for several days and some were shorter.

The first pool of pollution reached the Dunne intake on September 19 and lasted 5 days. Prior to this period, for 3 days there had been prevailing winds from east-southeast to south-southwest direction. These winds usually cause drifting of pools of pollution from that portion of the lake off the mouth of the Indiana Harbor Ship Canal and Calumet area toward Chicago's intakes. The winds continued for the next several days from this quadrant, ranging from southeast to southwest.

The pollution reached the Dunne Crib on September 19 and arrived at the Dever Crib on September 21 where it lasted for 3 days. The same slug with the same general winds prevailing was observed at the Wilson Avenue Crib on September 24.

A similar experience occurred during the period of October 4 to 16. During this period the winds again were from the quadrant between the compass points of southeast and southwest.

The polluted water first appeared at the Dunne Crib on October 4 and remained through October 13. It appeared at the Dever Crib on October 7, 8, 9, 10, 11, 14 and 16. This same pool drifted to the Wilson Avenue Crib intake twice on October 10 and once on October 11.

A third experience occurred during the period of October 24 - 31, inclusive. Beginning on October 24, the winds again moved into the critical quadrant between the southeast and southwest points of the compass. With few exceptions, the winds prevailed in a generally southern direction through October 31.

The polluted water appeared at the Dunne Crib on October 28 and remained through October 31. It reached the Dever Crib on October 30 but did not drift to the Wilson Avenue Crib. All of these pools had hydrocarbon odors and high ammonia nitrogen content.

A similar experience of pollution being transported as a result of wind action occurred in 1963 over the period of January 29 to February 2.

As indicated above, the prevailing wind preceding the incident was from the southeast to southwest quadrant. The slug of pollution reached the Dunne Crib intake on January 29. On January 31 the wind switched from southwest to south-southeast. The pollution arrived at the Dever Crib intake on February 2.

The raw water from this intake reached a maximum threshold odor of 10 Ch. The chlorine demand of this water amounted to 14.5 pounds per mg. The maximum threshold odor of the intake water from the Dunne Crib reached 50 Ch on January 29. The ammonia nitrogen content reached a maximum of 0.270 parts per million.

During the month of December 1965 the South District Filtration Plant experienced four principal odor periods. In length and severity these periods exceeded anything observed in recent years.

On December 12, the raw water from the crib intake had a maximum threshold odor of 90 Ch with an ammonia nitrogen content of 0.164 parts per million and the shore intake water on this day had a maximum threshold odor of 16 Ch and a maximum ammonia nitrogen of 0.080 parts per million.

The maximum carbon dosage on this day was 745 pounds per mg. The total activated carbon used during the month of December was 531,572 pounds. Of this total, 462,272 pounds were used during fifteen days of the high "Ch" odor threshold in the raw water.

The most recent appearance of industrial pollution occurred in February 1965. Hydrocarbon odors appeared at the Dunne Crib intake on February 6. The threshold odor reached a maximum value of 12 Ch on February 7. The ammonia nitrogen reached a maximum value of 0.138 parts per million on this day. These hydrocarbon odors in the raw water prevailed continuously for 7 days up to and including February 12. The maximum activated carbon dosage required by this water to produce an acceptable treated water was 320 pounds per mg.on February 7, 1965.

The next slide, please.

The next section of the statement is regarding the "Effect of Pollution on the Operation of our Treatment Plant".

The South District Filtration Plant is a typical water treatment plant with facilities for coagulation, settling, filtration, sterilization and taste and odor removal.

The plant is designed to receive Lake Michigan water either from the Dunne Crib intake 2 miles off shore, or from the shore intake, which is 2,500 feet out from the main shoreline, or from a mixture of both.

For the last three years, it has been necessary to use both intakes. The coagulants used are alum and chlorinated copperas (ferrous sulfate). Sterilization and oxidation is accomplished by the use of chlorine. Post ammoniation in the finished water is practiced for the purpose of maintaining sterilization residuals and for reducing chlorinous taste and odors.

Provision is also made for the removal of objectionable tastes and odors. This may be accomplished in two ways. Small amounts of phenols and some types of "fishy" or "musty" odors originating from the plankton in the water may be reduced by the action of chlorine.

The principal agent for taste and odor removal for the more difficult odors is activated carbon. This is a finely divided, highly absorptive material having its origin in certain charcoals. This material is received in bulk and on arrival is made into a slurry so that each gallon of slurry contains approximately one pound of activated carbon.

The storage capacity for carbon slurry has been steadily increased over the years as the carbon demans increased, now amounts to 180,000 pounds. A reserve stock of

350,000 pounds of bag carbon which is made into slurry when used is also kept on hand.

Carbon may be applied to the crib water by means of a bypass shaft 1,100 feet ahead of the chemical application channels. This is done when the phenol content of the crib water is at a significant level. This removes the phenols ahead of chlorination.

It is well established that when phenols are chlorinated, a very obnoxious medicinal odor is produced due to the formation of chlorophenols which are very difficult to remove. Carbon may be added at the beginning of the mixing period but in case treated water passes this point with inadequate treatment, it may also be added to the settled water as it goes on to the filters.

Control of Treatment

The operation of the plant stems from a control center. Here pumpage rates are set. The control engineer has available information from the pumping stations as to pumpage rates. Before him on the control panel, he has available indicated and recorded information as to the status of water levels and flows throughout the plant.

The control engineer also sets chemical dosages. He has available on the panel indicated and recorded information as to the pH and temperature of the raw waters as well as the pH and chlorine residual of the treated waters.

Next to the control center is the control laboratory which operates 24 hours of every day. This laboratory, at regular intervals, makes certain tests on the raw intake and treated waters that are necessary for control of the treatment process in all of its phases.

In addition to checking out the readings of the pH and chlorine residual recorders, the control chemist makes threshold odor and ammonia nitrogen determinations on the raw waters.

Normally, these tests are made at four-hour intervals. In case a taste and odor incident occurs, they are usually made every hour. The most important facility available in anticipating taste and odor incidents, is a Continuous Odor Monitor.

This gives an immediate qualitative indication as to the intensity and character of the odor of the water being supplied to that instrument. There are five of these. These sample water from the crib intake, the shore intake, the raw water header containing the prevailing mixture of crib and shore water, and from each of the two outlet shafts.

When there is a sudden and extreme change for the worse in the odors of the raw waters, the control engineer and the control chemist are immediately aware of this change. Thus the carbon application may be increased immediately and adjusted when the results of the threshold odor dilution tests are available.

Of great assistance in anticipating taste and odor incidents, are the wind direction and velocity instruments, the measuring elements of which are located at the top of the chemical building south penthouse. The indicating and recording instruments are located in the control center. It is well established that a wind from a southerly direction may bring up pools of industrial pollution from the Calumet region.

Problems in Handling High Pollution Periods

The first problem is to anticipate these periods. Watching the wind direction and velocity are important warnings. A drop in pH, a rise in temperature of the raw water are other indications. A drop in the chlorine residual of the treated water is another immediate indication of an increase of ammonia nitrogen or chlorine absorptive pollution.

It is well established that ten units of chlorine are required to decompose one unit of ammonia nitrogen. When the ammonia nitrogen content of the raw water is high, the problem is to add enough chlorine to decompose it and still leave enough chlorine present to destroy the bacterial pollution also present.

Another problem of operation is to keep on hand adequate reserves of the chemicals necessary to combat taste and odor incidents. Whenever a taste and odor incident begins continuing shipments of chemicals are begun.

In spite of expanding the storage facilities, in spite of a remarkable degree of anticipation, there have been several occasions in which the reserve supply of activated carbon was sufficient for less than 24 hours at the peak rate of consumption.

Additional dosages of alum are required for high carbon dosages in order that the carbon after completing its absorption function, may be coagulated and settled out. The ratio of the peak taste and odor incidents to normal usage for the application of dosages of carbon, chlorine and alum, are as follows:

Carbon,	70:1
Chlorine,	7:1
Alum,	4:1

The potential problems and hazards involved in treating highly polluted waters are:

1. Water with a highly obnoxious taste and odor may be supplied to the consumers.

2. It may be impossible to apply enough chlorine to decompose the ammonia nitrogen present and still leave enough to destroy the bacteria present introducing a potential hazard that a bacteriologically unsafe water might leave the plant.

No such occurrences have taken place since the South District Filtration Plant has been in operation but we are concerned with the future if pollution of the intake waters are not abated. Other operating problems have been produced as side effects in the increase of nutrient pollution, and are discussed in Section H of this report.

A very obvious and apparent result of this steady increase in the pollution of the raw water treated at the South District Filtration Plant has been a rapidly accelerating rise in the costs of chemicals for treatment. While there has been a slight rise in the price per pound paid for the chemicals, this is but a fraction of the total increase in the total cost of chemical treatment of the polluted intake water.

The annual average cost of chemicals used in treating water at the South District Filtration Plant has increased from $3.81 per mg. in 1955 to $6.35 in 1964. Projecting these costs at the present rate of increase into the future, it is obvious that the cost of producing a satisfactory water from such a highly polluted source, may well become prohibitive. It is also possible, if this pollution continues, that the capacity of this plant to properly treat such a polluted water, may soon be overtaxed.

I would like to depart from my prepared statement to tell you about the provision that our new Central District Filtration Plant has a very sophisticated type of instrumentation for controlling treatment in the plant.

We are now taking bids for a computer which will cost about a quarter of a million dollars, which will function to scan all of our 250 instruments in various parts of the plant, at very frequent intervals and print out on a data log when it exceeds or goes under set points.

We plan later to try to use the computer to automate certain functions in the treatment.

Next slide, please.

This section is on the Effect of Nutrient Pollution of Lake on Plankton Development.

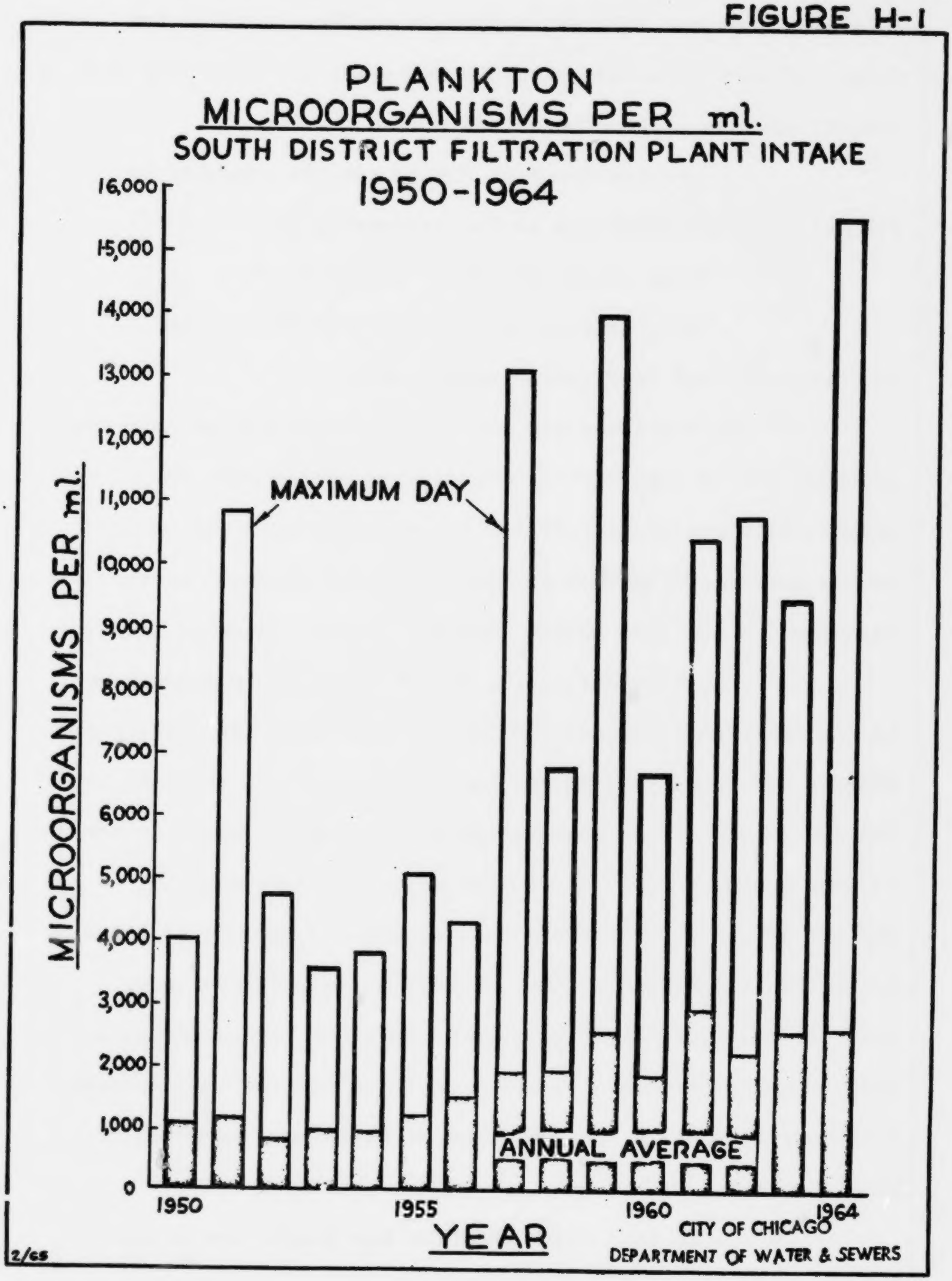
The increased nutrient waste discharge into the southern end of Lake Michigan, indicated by the rise in ammonia nitrogen content of the water, has caused increases in the numbers and changes in the species of plankton microorganisms in the lake water. (See Fig.H-1 on following page.)

In recent years routine tests for phosphorus in the water were carried out in our laboratory other than on samples for complete chemical analysis. However, in light of the ABS (synthetic detergent) pollution found to exist in the Indiana Harbor Ship Canal discharges to the lake and the results of laboratory determinations made by the United States Public Health Service in their recent surveys, there is no question that sufficient phosphorus exists in the water to act with the high ammonia nitrogen content to furnish the necessary nutrients to sustain the increased plankton growths which have been observed.

In this chart shown on the board, the annual average number of plankton organisms per millileter and the

(Continue text page 450)

FIGURE H-1



PLANKTON
MICROORGANISMS PER ml.
SOUTH DISTRICT FILTRATION PLANT INTAKE
1950-1964

maximum number found during any day in each year for the period 1950-1964 in the lake water at the South District Filtration Plant intakes. This chart shows in a very striking manner the general upward trend in plankton numbers over the period. The annual average microorganisms per milliliter more than doubled from 1076 in 1950 to 2624 in 1964, and the number found in the water during the maximum day of each year increased from 3961 in 1950 to 15,510 in 1964.

The prevailing type of algae in the lake at the Chicago intakes has been the diatoms Tabellaria, Fragilaria and Asterionella. Normally there are spring and fall peaks of these organisms, usually rising when the water temperature ranges between 45 and 55 degrees Fahrenheit.

Under normal operation, the filters at the South District Filtration Plant are washed about once in 24 hours or longer. However, when the algae numbers in the intake water reach their peaks, the coagulation is less effective in settling out the microorganisms, and clogging of the filters results, cutting down the filter runs to about 6 or 7 hours. At such time, the operating problems caused by larger number of filter backwashes and the increased "time out" of filters being washed, decreased the plant capacity considerably. Such occurrences during peak demand periods in the water system have had serious consequences in reducing the available capacity of the plant when needed most.

As previously indicated, normally the population peaks of plankton in the water are reached in the spring and the fall of each year; however, in 1956 a new problem appeared -- a new diatom which had existed in small numbers heretofore, began to occur in appreciable numbers. This diatom is known as Stephanodiscus hantzachii. It is a small diatom that grows best when the water temperature ranges between 32 and 39 degrees Fahrenheit. This organism does not interfere with filter runs but in its life cycle produces colloidal calcium carbonate which produces colloidal turbidity in the water, and raises the hydrogen ion concentration of the water. This in turn requires the use of much more coagulant.

In 1959 another difficult water diatom appeared -- this one had not been observed in Lake Michigan until that time. It has been reported as being present in the St. Lawrence River water at Montreal in 1956.

This organism is known as Stephanodiscus binderanus. It is a filamentous diatom and in addition to raising the hydrogen ion concentration of the water, produced colloidal calcium carbonate when present in large quantities, and the organisms not settled out in the basin are carried on to the filters, producing short filter runs and creating serious operating problems because of the large number of filter washes required.

In January 1960 this organism occurred in sufficient numbers to reduce the filter runs at the South District Filtration Plant to less than 7 hours. Therefore, the problem of short filter runs, which normally occurred only on a seasonal basis, is now present almost all the year round, resulting in increasing the costs of treatment and creating operating problems in the plant.

Another result of increased amounts of phosphorus and ammonia nitrogen in the lake water has been the increase in the growth of the filamentous algae known as Cladaphora. This algae has been found growing along the rocks around the bulkhead of the filter plant and has been observed by skin divers growing in patches at the bottom of the lake near the plant intakes.

The wave action of the lake loosens this algae and it collects on the screens of the intake basin ahead of the low lift pumps, clogging these screens and reducing the flow through them. At times each summer it has been necessary to keep a crew of laborers busy cleaning these screens which are of the fixed type and not adaptable to automatic cleaning.

Four to six men are kept busy almost every day for a period of six weeks to three months, cleaning screens of this particular algae. Each year clogging of the screens increases and the period over which it is necessary to clean the screens of this algae lengthens out. In 1964 it was necessary to clean the screens as late as the first week in November.

And now, I come to the last section. It is on Recommended Quality Criteria Goals for Lake Water at the Chicago Water Works Intakes.

Next slide, please.

We have been requested to develop recommendations for desirable quality criteria goals for various parameters of quality for Lake Michigan water received at our water works intakes. We are fully aware of the pit-falls that are inherent in setting water quality criteria goals and are, therefore, approaching this matter with great caution and trepidation, and with full knowledge that only a practical and reasonable recommendation for quality goals can be justified.

Lake Michigan water in its natural state has been an excellent source of water supply and lends itself to treatment in conventional rapid-sand treatment plants to produce a superior quality water for domestic and industrial use.

It is only during periods when industrial and sewage pollution of the water with contaminants such as coliform bacteria, odor producing wastes which are difficult to remove, ammonia,nitrogen, phenols, ABS and various organic wastes having unknown chemical constituants, are present in the water that it becomes difficult to produce our customary high quality water in the conventional treatment plant. Also increased nutrients in the water definitely tend toward bringing about biological degradation of the lake and the problems that go with it.

We have prepared recommendations which we believe are both desirable and practical for attainment of the maximum goals in various parameters of quality which, if met, should present no serious problems in producing a safe and palatable, superior quality water for the consumers in Chicago and the metropolitan area.

These are maximum goals which should never be exceeded but it is most desirable that these parameters be kept at levels below these maximums at all times.

I am showing on the slide the Recommended Quality Criteria.

These are not too strict. I would say most of the time, water at our intakes met these standars; but, by setting the criteria limits and also setting permissable limits for not more than 12 days per year, we feel that an acceptable water can be received at our intakes which will lend itself to efficient treatment in our plant.

We have purposely omitted the parameter "odor threshold" number because of differences which exist in the effectiveness of water treatments for removing various types of odors from the water. It has been our experience that it is more difficult to reduce a "hydrocarbon" type odor of 6 threshold intensity to an acceptable level, than an algae-type odor of 15 threshold intensity.

We are, therefore, suggesting that natural algae odors be omitted from these parameters, and set a maximum goal of a threshold odor number of 6 in the intake water for odors produced by industrial waste pollution with the particular caution to be observed that the odors so caused should always be of such nature as to come within the capacity of a conventional water treatment plant for their removal.

The statement was prepared by Oscar Dillens and his assistant, Jim Vaughn, who played a big part in the preparation of this report.

Nick Kuhn, the head of the Water Safety Control Section, furnished most of the data, since it was collected under his jurisdiction.

Thank you.

CHAIRMAN STEIN: Thank you, Mr. Gerstein.

Why don't you wait up there a minute.

Speaking for myself, Hy, I want to say that I have waited twenty years for that statement and it was worth waiting for.

MR. GERSTEIN: Thank you.

CHAIRMAN STEIN: I think it was completely comprehensive and I don't know where the views and information you presented in the report are going to lead. But I am sure that these views and this information will have to be taken into consideration in any evaluation of water quality in this area.

I suspect that this paper is such a classical example of our problem that it will very well be used in other regions throughout the country.

If this conference accomplishes nothing else, at least, we provided the forum for the deliverance of the paper.

Thank you very much.

Wait, let's see if there are any comments or questions.

Any questions?

Wait just one moment. Mr. Poston?

MR. POSTON: I would like to ask Mr. Gerstein if he's made cyanide analyses on raw water and have they had any reason to suspect that they might have --

MR. GERSTEIN: I checked with Jim Vaughn on this matter and we haven't taken very many samples for cyanide tests, but all those that we have taken in the lake have been negative for cyanide.

MR. POSTON: I was going to ask one more question and that pertained to whether you have any estimated total annual cost of treatment because of pollution?

In other words, whether you could break out the cost of extra chemicals and extra filter washing?

MR. GERSTEIN: I don't have that figure.

It can be obtained. It is rather difficult. But, frankly, I am not really concerned about the cost.

I think the problems that come with treating a polluted water and the possible ramifications, if the treatment wasn't proper, are more important than any costs that we might have.

MR. POSTON: Thank you. I thought it was excellent.

CHAIRMAN STEIN: For the conferees--and maybe they want to hold you when you finish this--I think we have two points here.

I think one is that for the first time, at least to me, I have seen recommended water criteria goals. This should be borne in mind during the rest of the conference by the conferees. There was another point that Mr. Gerstein raised--and this is always one of the most awkward spots for a Chairman who has to keep his eye on the unresolved issues--and I bring it up because I wondered particularly if the Sanitary District would later, in its presentation, be careful to include this: Mr. Gerstein, generally speaking, said that the report is in accord with the data and reports presented by Mr. LeBosquet yesterday, and I think that these reports speak for themselves and the conferees will be able to evaluate. However, Mr. LeBosquet said that the Calumet River and its wastes went back into Lake Michigan a significant number of times. There was a question on that by Colonel Chesrow. This is still, to my mind, an unresolved issue.

I think Mr. Gerstein's figures as I saw them up there were something like 38 in one place, 49 percent in another place and I just raise this issue.

I am not saying whether it is significant or anything of that kind, but, I would think that before the conference is concluded, the Sanitary District in its presentation, may want to cover that so the conferees will be able to come to a uniform judgment.

Are there any other points or comments?

(No response.)

If not, you know, we do have a lot of people and we are going to keep your nose to the grindstone.

Mr. Klassen has a few more people to call before lunch and I think we are not going to go past 12:30, but we are going to try to expedite this as much as possible.

Mr. Klassen?

MR. KLASSEN: Yes, that is the general timing.

One of the real important jobs in the city of Chicago is the Commissioner of Health.

He's got to keep his eye open for present and possible future potential hazards to health,

Chicago is fortunate to have a Health Commissioner that has a rare combination of medical and environmental health competencies.

At this time, I am going to ask Dr. Andelman, Commissioner of Health of the City of Chicago, to present his statement to this conference.

DR. ANDELMAN: Thank you, very much.

MR. KLASSEN: He is locally known as Dr. Sam.

DR. ANDELMAN: Thank you, very much.

I see some of you smoking. I want to make sure this is not affecting water pollution.

(Laughter)

Honorable Chairman, Conferees Poston, Poole Klassen, Colonel Chesrow, public officials, representatives citizen groups, ladies and gentlemen:

The citizens of Chicago who inhabited these shores at the turn of the Century, when Chicago was a fledgling community, dealt sternly and realistically with the problem of disease and nuisance-creating pollution of Lake Michigan.

Their foresight in establishing the Metropolitan Sanitary District of Greater Chicago with its world renowned record for efficient waste treatment, and the outstanding engineering feat of reversal of the flow of the Chicago River were critical factors in permitting the development of Chicago as a leader residential, business and industrial center whose citizens enjoyed the health benefits of a safe, potable drinking water supply and water-oriented recreation areas second to none.

The construction of modern water treatment plants became necessary in order that safe, potable water, free of disease-producing contaminants, would be available in sufficient abundance to assure protection of the public health and continued residential and industrial growth. To meet our obligations the City of Chicago has just completed the construction of the world's largest and most modern water treatment plant designed to supply not only Chicago but also other communities served by Chicago's water system.

In addition to constituting a domestic raw water source for our drinking water, Lake Michigan provides recreation for millions of citizens of Chicago and the metropolitan area. We have been justly proud of our bathing beaches and aquatic recreational facilities.

Because of these aforementioned actions, the City has had an excellent record with respect to the control of waterborne diseases. The maintenance of this record, however, has been dependent upon many factors including maintenance of a highly trained staff of water safety experts. These experts advise us that an increasing amount of inferior quality lake water moving in from the south of the City has been noted at the water intakes of the South District Filtration Plant. Already it is noted that a number of beaches in the communities to the south of Chicago have been closed because of polluted water in Lake Michigan.

The United States Public Health Service and the responsible city and state officials concerned with the protection of the health of our community advise us that pollution from both municipal sewage disposal systems and from some industrial plant discharges is becoming a serious problem and creating potential health hazards, as well as adding substantially to the economic burden on the taxpayers of this community due to the increased cost for the treatment of our drinking water.

Studies carried out by the United States Public Health Service and the Chicago Department of Water and Sewers during the years 1962 through 1964 indicate an increasing degree of fecal type contaminants in the waters at the southern end of Lake Michigan.

The United States Public Health Service states: "Highest coliform concentration occurred in the waters extending from the mouth of the Calumet River to the Indiana Harbor and out to a distance of approximately two miles off shore."

This contaminated water, due to current flows in the south end of Lake Michigan, moves northward until it reaches the South District Water Filtration Plant intakes and the beaches in the southern half of the City of Chicago. The presence of these polluted waters presents a definite health hazard because when there is increased concentration of non-pathogenic organism, pathogenic bacterial and viral organisms obviously must increase also as greater and greater amounts of sewage empty into the lake.

We in Public Health are rightly concerned since this type of pollution carries with it the threat of outbreaks of infectious hepatitis, typhoid fever, Salmonellosis, and possibly other virus or bacterial diseases, which we have not had since the late 1800's.

In order to successfully control these water-borne diseases, it has been necessary to maintain constant vigilance of the safety of our water supply and to require more money for the construction of new water treatment facilities.

At present, water used for drinking purposes is being maintained safely. Persons using the lake for swimming and other recreational purposes do not have the protection of filtration and chlorination, but come in direct contact with the polluted water; hence hazard to them is markedly greater than exists from the drinking of properly treated water.

The waters of Lake Michigan that are used for drinking, bathing and recreational activities should be free from undesirable appearance, odor, and taste. In this connection industrial wastes such as phenolics, oils, cyanides, flue dust and popcorn slag play a serious role in the Lake Michigan water pollution problem.

Industrial wastes impart undesirable odors to the water and in sufficient concentration may also be deleterious to health when ingested over a long period.

Specifically, any contamination of our drinking water with intestinal organisms, even though they be harmless in themselves, is an immediate signal of potential danger.

Furthermore, the viruses of poliomyelitis and infectious hepatitis may both be disseminated by fecal contamination of the water supply. The fact that we now have an effective vaccine against poliomyelitis does not alter the situation. There is no such vaccine against hepatitis, and this disease is still a serious health problem.

Good sound public health preventive medical practice demands that our water resources be maintained in the cleanest possible condition.

The United States Public Health Service report titled, "Report on Pollution of the Waters of Grand Calumet River, Little Calumet River, Calumet River, Lake Michigan, Wolf Lake and Their Tributaries, Illinois - Indiana", dated February 1965, contains adequate documentation of the sources of pollution which may adversely affect the health and well-being of citizens residing in our communities.

The City of Chicago has used every lawful measure available to control and prevent pollution insofar as this municipality is concerned. We have received assurance from our responsible state agencies that similar measures are being undertaken by the State of Illinois.

Is it not timely for us to ask that our great neighboring State of Indiana and the responsible officials of local communities in that State, together with industries who may be contributing to the pollution of interstate waters, take immediate remedial and necessary preventive measures to halt such pollution which jeopardizes not only the citizens of Chicago, but citizens of Indiana as well.

It is my great hope that this conference called by Honorable Anthony J. Celebrezze today will be consummated by the development of an acceptable program and schedule under which the State of Indiana, with the cooperation of the Federal Government and the State of Illinois, will bring about a cessation of pollution, thereby assuring us and future generations of a wholesome water supply.

Thank you very much.

CHAIRMAN STEIN: Thank you, Dr. Andelman.

(Applause)

Any comments or questions?

(No response)

If not, --

MR. KLASSEN: This is an off-the-record remark.

(Discussion off the record)

MR. KLASSEN: Most of the audience, I am sure, is aware of the fact that the Illinois Legislature has excluded from the jurisdiction of the Sanitary Water Board the Sanitary

District of Chicago. This accounts for the co-conferees, the Sanitary Water Board and the Chicago Sanitary District.

The next brief presentation -- it is brief because it covers a small area -- will be made on behalf of the State Sanitary Water Board by Mr. Richard Nelle, who is the Co-ordinator of the Board enforcement activities and handles our water resources information. He will be assisted by Ben Leland, coming up the aisle here, who is in charge of the Sanitary Water Board of Chicago Office.

I do want to call attention to the map over here, the three white areas that you see. Do you want to point them out for a minute, Leland? They are the areas under the jurisdiction of the State Sanitary Water Board.

CHAIRMAN STEIN: Those are the three areas left of the Illinois line within dotted areas, because this won't show up when we reprint it.

MR. KLASSEN: The dotted area, the one at the left, Chicago Heights and the Homewood area, then the next is the Thornton area and then next is Lansing.

Mr. Nelle, will you make the presentation for the Board?

MR. RICHARD S. NELLE: Mr. Chairman, conferees, ladies and gentlemen:

I am Richard S. Nelle, Sanitary Engineer, Illinois Department of Public Health, serving under direction of Clarence W. Klassen, Chief Sanitary Engineer of the Department, and Technical Secretary of the Illinois Sanitary Water Board.

My principal duties for almost thirty years have been in activities relating to Illinois programs of water pollution abatement, prevention, and control. In the course of my work, I have devoted much time and effort to the region under consideration at this conference.

The accompanying map of Calumet Region shows the areas over which the Illinois Sanitary Water Board has responsibility for water pollution control. Other areas in this part of Cook County have been subject to control by the Metropolitan Sanitary District of Greater Chicago since 1956, prior to which year 159th Street (U.S.Route 6) defined the general southern boundary of the District.

Pollution control of Lake Michigan waters within the State are a responsibility of the Board from the north Cook County line to the State of Wisconsin, and in Cook County from sources other than those originating in the Sanitary District.

From 1929 to 1946, surveys and sampling in the Calumet Region for the Sanitary Water Board encompassed streams within the Chicago Sanitary District, as the responsibilities for stream pollution control were less well defined than at the present time.

It is sufficient to note that in Thorn Creek watershed through constant public demands for cleaner streams and through Sanitary Water Board action, numerous raw sewage discharges were eliminated, and all sewered municipalities now have secondary treatment facilities. Although the water quality of these streams are not ideal, a gradual improvement of conditions has been noted in the past thirty years or more, despite a growing population and greater industrial activity.

These streams are not large for the populations that use them for wastewater treatment effluent assimilation and transport. During dry weather the flow in Thorn Creek approximates the combined volumes of sewage treatment plant effluents.

(See Table I on following page)

In Table I are listed the municipal wastewater works located within the Little Calumet River drainage system under Sanitary Water Board jurisdiction. An estimated 124,000 persons are served by sewers and secondary treatment, and with some included industrial waste the population equivalent is about 132,000.

Population equivalent is a calculated wastewater strength equal to a normal waste contribution by the same number of persons. Present treatment plants, all of which have been built, enlarged, or improved in the past ten years, have a nominal capacity for treatment of wastes of 140,000 population equivalent.

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TABLE I

DOMESTIC WASTEWATER WORKS – LITTLE CALUMET RIVER WATERSHED ILLINOIS SANITARY WATER BOARD AREA

Municipality	Receiving Stream	Estimated Load to Sewers and Treatment		Design Capacity P.E.	Year Built or at Last Expansion
		Population	P.E.(a)		
Lansing	Little Cal. R.	18,500	18,500	25,000	1958
Thornton	Thorn Creek	2,900	2,900	4,500	1959
Homewood	Butterfield Cr.	15,000	15,000	16,000	1956
Flossmoor	Butterfield Cr.	4,800	4,800	8,000	1956
Olympia Fields					
Main	Butterfield Cr.	800	800	2,500	1960
Olympia Woods	Butterfield Cr.	400	400	1,500	1959
Graymoor	Butterfield Cr.	180	180	400	1954
Matteson	Butterfield Cr.	3,200	3,200	5,000	1959
Richton Park	Butterfield Cr.	1,050	1,050	3,000	1964
Bloom Township San. Dist.(b)	Thorn Creek	68,000	75,000	60,000	1958
Crete	Deer Creek	2,750	3,500	4,000	1963
Steger	Third Creek	6,400	6,400	10,000	1954
3 Minor(c)	Plum Creek	--	100(e)	--	--
3 Minor(d)	Thorn Creek	--	100(e)	--	--
		123,980	131,730	139,900	

(a) – Population Equivalent
(b) – Chicago Heights, South Chicago Heights, Park Forest
(c) – 2 Subdivisions and 1 country club
(d) – 1 Subdivision, 1 medical center, and 1 industrial domestic
(e) – Excluded from totals

NOTE: All wasteworks provide secondary treatment capable of 5-day Biochemical Oxygen Demand reductions of greater than 85%. Estimated total P.E. to streams 17,500

Bloom Township Sanitary District serving Chicago Heights, South Chicago Heights, and Park Forest collects and treats about one-half of the total wastewater in the Thorn Creek watershed. Included in this presentation is a brief statement from the District concerning its future plans and programs.

Table II lists observations and analytical results taken at a sampling station located on Little Calumet River at Wentworth Avenue in Lansing. These results portray the general water quality of the River as it comes from the State of Indiana.

The data indicate quantities of organic matter present in the water or presumably in bottom deposits sufficient to depress the dissolved oxygen content below satisfactory levels. In past years a diurnal change in dissolved oxygen has been noted with absence or low values at daybreak and high values by mid-afternoon.

(See Table II on following page.)

Table II further shows coliform bacteria and enterococcus counts in a range of values consistent with numbers found in fresh or dilute sewage treatment plant effluents. Other constituents likewise confirm the presence of undesirable amounts of waste matter.

(See Table III on following page.)

Table III lists similarly the water quality of Thorn Creek near its confluence with Little Calumet River. Co-incidentally, the values for various tests are much of the

(Continue Text on Page 472)

TABLE II

WATER QUALITY MONITORING PROGRAM – LITTLE CALUMET RIVER

SAMPLING POINT: Wentworth Avenue Bridge downstream from Indiana State Line west of Hammond, Indiana. (WQ Station 02 HB)

Date	Lab. No.	Temp. F.	pH	D.O. mg/l	B.O.D.$_5$ mg/l	Bacteria #/100ml		Turbidity – Units	Specific Conductance micro-mhos	Total Dissolved Solids mg/l	Alkalinity mg/l	Hardness mg/l	ABS mg/l	Chloride mg/l
						Coliforms	Entero-cocci							
1959														
August 19	3597	--	7.7	--	26	46,000	--	29	930	558	286	452	0.0	40
December 10	9529	--	7.7	8.0	9	144,000	680	10	849	509	218	438	0.0	25
1960														
August 19	4200	90	7.6	--	17	101,000	--	35	935	551	266	420	25.0	41
1961														
February 17	14880	--	7.7	5.4	17	70,000	2,400	26	745	447	192	310	0.0	32
1963														
August 2	3769	--	7.1	0.0	5	140,000	20	16	753	452	170	348	1.0	39
1964														
February 7	15915	40	7.8	3.0	15	120,000	1,000	10	1,040	624	262	444	3.0	53
September 2	6677	70	7.6	0.6	19	1,900,000	410	18	1,051	631	238	424	1.2	54
1965														
January 5	14040	38	7.7	8.8	5	300,000	5,000	25	1,002	605	194	452	0.5	56
January 12	14482	33	7.6	6.8	10	200,000	6,000	25	1,114	668	246	504	0.8	55
January 19	14868	33	7.5	1.2	7	150,000	3,000	28	1,382	829	330	620	1.1	75
January 28	15471	32	7.4	10.0	5	180,000	2,000	115	682	409	104	300	0,3	30
Median Value			7.6	5.4	10	144,000	2,000	25	935	558	238	438	0.8	41
High Value			7.1	10.0	26	1,900,000	6,000	115	1,382	829	330	620	25.0	75
Low Value			7.8	0.0	5	46,000	20	10	682	409	104	300	0.0	25

TABLE III

WATER QUALITY MONITORING PROGRAM – THORN CREEK

SAMPLING POINT: 167th Street Bridge, East of Calumet Expressway (WG Station 01 HBD)

Date	Lab. No.	Temp. F.	pH	D.O. mg/l	B.O.D.$_5$ mg/l	Bacteria #/100ml		Turbidity – Units	Specific Cond. micro-mhos	Total Dissolved Solids mg/l	Alkalinity mg/l	Hardness mg/l	ABS mg/l	Chloride mg/l
						Coliforms	Entero-cocci							
1959														
July 22	1491	--	7.8	--	9	--	--	26	1,290	775	220	410	0.0	85
December 10	9530	--	7.4	6.8	19	192,000	400	15	1,774	1,064	250	578	2.0	188
1960														
August 19	4201	90	7.5	--	10	200,000	50	19	1,928	1,147	286	564	3.0	175
1961														
February 17	14879	--	7.7	8.4	11	240,000	240	13	1,794	1,076	282	512	0.0	228
1963														
August 2	6768	--	7.1	0.4	8	34,000	20	26	1,687	1,012	160	530	2.5	244
1964														
February 7	15913	40	7.5	2.6	6	91,000	1,000	32	2,230	1,338	320	680	3.0	289
September 2	6678	69	7.7	1.2	3	300,000	160	34	2,080	1,248	306	608	1.8	272
1965														
January 5	14039	43	7.7	10.0	6	500,000	16,000	32	1,402	841	236	516	0.6	137
January 12	14483	38	7.5	8.0	15	300,000	13,000	20	1,722	1,033	272	572	1.3	204
January 19	14869	34	7.6	7.4	13	1,800,000	9,000	30	2,144	1,286	354	600	1.9	85
January 28	15470	32	7.6	9.0	6	200,000	5,000	140	952	571	152	352	0.3	82
February 4	15855	--	7.6	--	24	--	--	30	1,918	1,151	336	620	0.6	220
Median Value			7.6	7.4	10	220,000	700	28	1,784	1,070	277	568	1.6	196
High Value			7.8	10.0	24	1,800,000	13,000	140	2,230	1,338	354	680	3.0	289
Low Value			7.1	0.4	3	34,000	20	13	952	571	152	352	0.0	82

same order as those shown in Table II and the same general comments are applicable although the flow in Thorn Creek is about one-half that in Little Calumet River.

It should be noted that the muncipalities of Glenwood, East Chicago Heights, and Sauk Village are within the Chicago Sanitary District and also within Thorn Creek watershed. Their combined population is about 9,000.

Plum Creek, having its source in eastern Will County, flows northeasterly into Indiana, becomes known as Hart Ditch and empties into Little Calumet River at the northeast corner of Munster, Indiana. Three small sewage treatment plants serving two undeveloped subdivisions and a country club drain into Plum Creek tributaries. Sampling data included in Table IV do not indicate significant pollution entering the State of Indiana from Illinois. (See Table IV on following page.)

Since its inception in 1929, the Sanitary Water Board has refused to grant permits for new combined sewer systems and has required that extensions to existing combined sewer systems be made on the separate sewer plan.

A permit issued to the Village of Lansing for sewer development in a private tract constitutes the single exception to this policy. In the case of Frank vs. Village of Lansing and State Sanitary Water Board, No. 48398, Illinois Appellate First District, the Appellate Court affirmed the order of the Circuit Court directing the issuance of a permit

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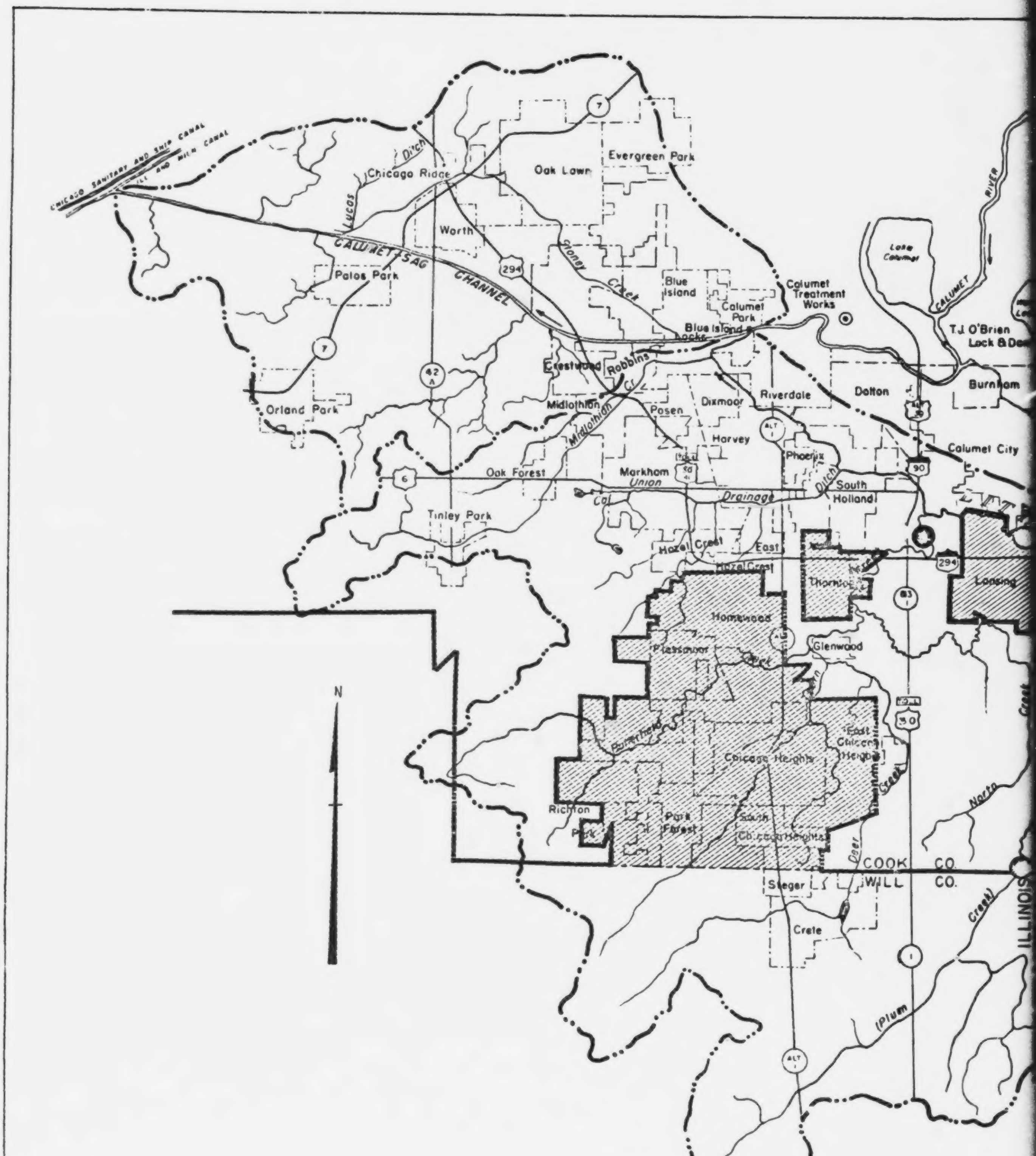
TABLE IV

WATER QUALITY MONITORING PROGRAM – PLUM CREEK (HART DITCH – LITTLE CALUMET RIVER)
SAMPLING POINT: Steger Road (WQ Station 01 HBE)

Date	Lab. No.	Flow cts	Temp. F.	pH	D.O. mg/l	B.O.D.$_5$ mg/l	Bacteria #./ml		Turbidity – Units	Specific Cond. micro-mhos	Total Dissolved Solids micro-mhos	Alkalinity mg/l	Hardness mg/l	ABS mg/l	Chloride mg/l
							Coliforms	Entero-cocci							
1965															
January 5	14038	< 5	35	8.0	13.2	3	300	300	44	909	545	166	420	0.2	44
January 12	14481	< 5	33	7.9	14.0	4	0	40	13	1,053	632	218	532	0.0	43
January 28	15472	< 5	32	7.4	11.8	3	18,000	1,000	115	651	391	84	308	0.0	17
February 16	16445	< 5	34	7.8	14.8	2	4,000	170	54	743	446	124	380	0.0	17

< – Less than


CHICAGO SANITARY AND SHIP CANAL
ILL AND MICH CANAL
Ditch
Lucas
Chicago Ridge
Oak Lawn
Evergreen Park
7
Worth
CALUMET-SAG CHANNEL
294
Stoney Creek
Palos Park
Blue Island
Calumet Park
Calumet Treatment Works
Blue Island Locks
Lake Calumet
CALUMET RIVER
T.J. O'Brien Lock & Dam
42 A
Crestwood
Robbins
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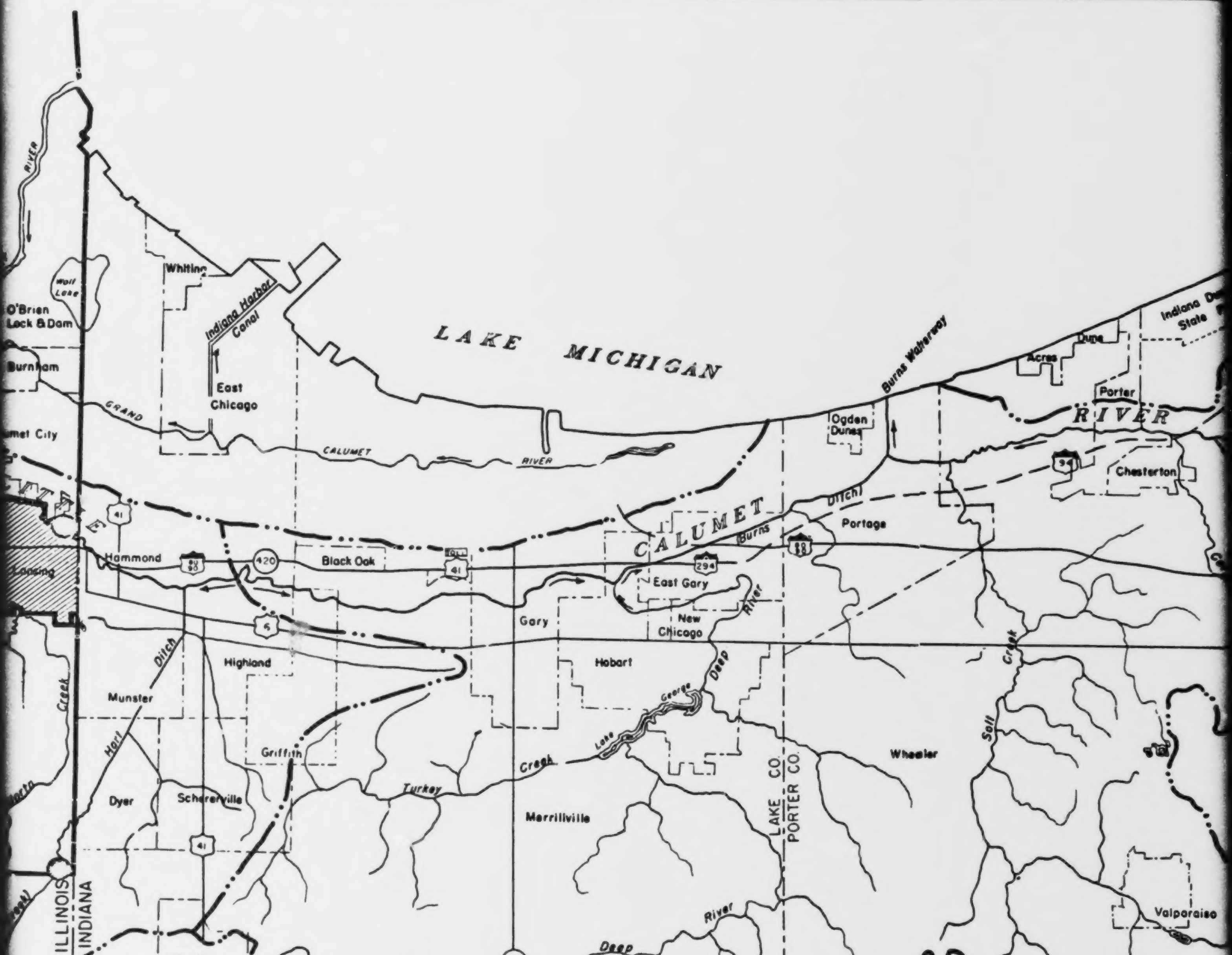
STATE OF ILLINOIS

SANITARY WATER BOARD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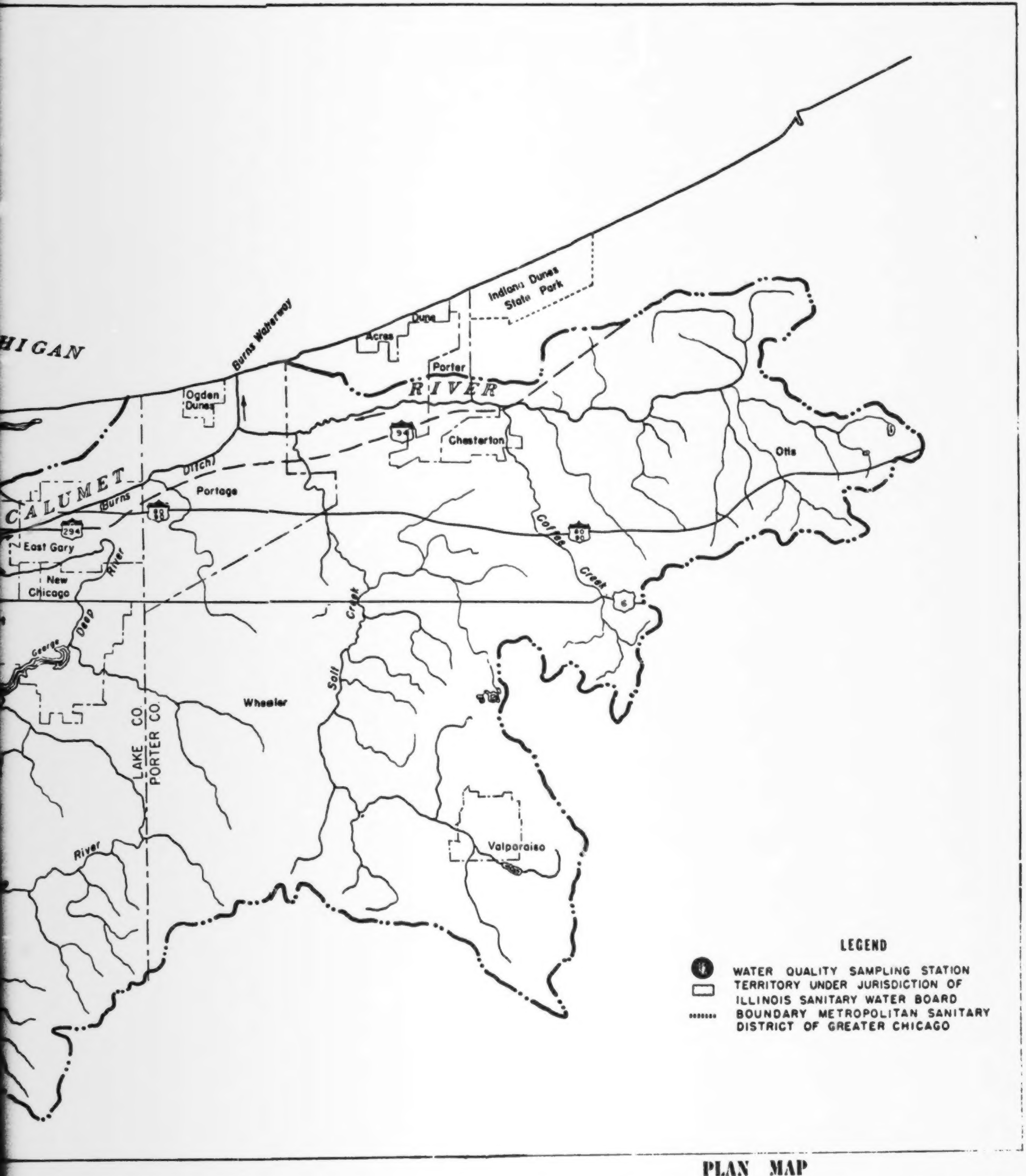
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LEGEND
WATER QUALITY SAMPLING STATION
TERRITORY UNDER JURISDICTION OF ILLINOIS SANITARY WATER BOARD
BOUNDARY METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO

PLAN MAP

CALUMET REGION & LAKE MICHIGAN WATERSHEDS to the plaintiff in accordance with plans and specifications filed with the Sanitary Water Board.

Finally, it should be mentioned that the Sanitary Water Board does not grant permits for sewers unless adequate treatment facilities exist or are assured. Many of the treatment works in the Thorn Creek watershed were enlarged or improved as a requisite for consideration of sewer system expansion.

CHAIRMAN STEIN: Thank you.

Are there any comments or questions?

(No response)

Thank you very much, sir.

MR. KLASSEN: I am going to ask Mr. Meers, the Superintendent of the Thorn Creek-Bloom Township Sanitary District, to make a brief statement on behalf of that Sanitary District which embraces the areas of Park Forest, Chicago Heights, and that immediate area.

Inasmuch as this was mentioned in the Public Health Service report and referred to several times, I wanted it as a matter of record what this Sanitary District has and is doing.

CHAIRMAN STEIN: Without objection, Mr. Nelle's complete report, including the chart and map will appear in the record.

MR. MEERS: Mr. Chairman, Honorable conferees, ladies and gentlemen:

I am J. Edward Meers, Manager-Superintendent of the Sanitary District of Bloom Township, Chicago Heights, Illinois.

The Sanitary District of Bloom Township is located 24 miles south of the Chicago Loop and 6 miles west of the Indiana State line. The Sanitary District serves Chicago Heights, South Chicago Heights and Park Forest, Illinois. The present connected population is 75,357. On June 4, 1928, a referendum was held and the formation of the Sanitary District was approved.

The first wastewater treatment plant, a septic tank and contact bed, was built in 1907 to serve the City of Chicago Heights. In 1921 this plant was revised to an Imhoff tank and trickling filter type plant. Construction was started in 1935 on a new activated sludge plant and additions were completed on the activated sludge plant in 1956.

The Sanitary District initiated a survey and study of the infiltration of storm water into the sanitary sewer system. The District has a separate sewer system. The result of this study was a report entitled, "Study and Survey of the Nonuse and Misuse of Sanitary Sewers", 1959, E. H. Ashdown; Consulting Engineer, Chicago Heights, Illinois.

We received cooperation of the Municipalities served by the District and during a three-year period, from 1961 to 1964, only ten percent of the flow received at our treatment plant was attributed to the infiltration of storm water.

The Sanitary District conducted a comprehensive industrial waste survey and wastewater treatment plant evaluation study. Forty-seven (47) industries were surveyed and their wastes were studied, identified and characterized.

During the course of this survey and study the industries, officials and personnel were very cooperative. The Sanitary District's policy is that industry should eliminate objectionable industrial waste at the source. Industry has responded in various ways, but with gratifying results.

One industry which produces a waste which is very difficult to treat has installed industrial waste treatment facilities and these facilities are doing a very satisfactory job.

Another industry is making an intensive study of possible waste abatement measures within its plant and records of sampling have shown marked improvement.

One of the companies has designed and installed additional pretreatment facilities.

Still another has agreed to purchase and install monitoring equipment which, in their case, was the only corrective measure considered necessary.

One large industry was found to be discharging oil directly to the stream during heavy rains. Sufficient storage capacity has been provided and arrangements made to adequately dispose of these oil wastes.

The industrial waste study has resulted in some accomplishments other than the remedial measures taken by those industries. Foremost is the keener understanding of the effects of industrial wastes on the treatment plant and knowledge of the industries needing remedial action, those needing further investigation, and those which produce no significant wastes.

Another very important accomplishment has been the development of greater respect and appreciation of the District's problems by people in all the industries in the community. The associations resulting from this study greatly enhance the long and continued effort to educate these people to appreciate waste treatment and cooperate in the control of pollution.

Laboratory pilot plant studies conducted to determine the effect of industrial wastes on the treatment plant actually demonstrated some possible modifications in operation which permitted the plant to accommodate these difficult industrial wastes with less ill effects. The laboratory pilot plants have been continued and have even become a control feature of the treatment plant.

The Sanitary District retained Dr. R. S. Engelbrecht and Dr. Ben B. Ewing, Professors of Sanitary

Engineering, University of Illinois, to supervise and conduct the abovementioned survey and study. The final report of this study is entitled, "Future Planning - Plant Evaluation and Industrial Waste Survey, Sanitary District of Bloom Township, Park Forest, Chicago Heights, South Chicago Heights, Illinois, April 1963, Ewing, Engelbrecht and Associates, Champaign, Illinois."

The Sanitary District has entered into a co-operative agreement with the United States Department of the Interior, Geological Survey, to construct, install, equip and operate a stream gaging station located above our wastewater treatment plant at Halsted Street in Chicago Heights. The stream gaging station was constructed and put into operation in June 1964. Our District is now measuring the flow of the stream, sampling and conducting stream evaluation studies.

The wastewater treatment plant of the Sanitary District of Bloom Township is achieving consistently 85 percent or higher biochemical oxygen demand (BOD) and suspended solids (SS) removal efficiency.

The Board of Trustees of the Sanitary District have retained the services of a competent sanitary engineering firm to prepare plans and specifications for construction and installation of additional treatment facilities at our wastewater treatment plant.

It is my considered opinion that, if industry will continue to cooperate with the District in our industrial waste program and the treatment plant expansion completed in accordance with the consulting engineer's recommendations, the present and future needs of the Sanitary District of Bloom Township will be adequate for the next ten to fifteen years, provided the population trend, industrial development, and area expansion remain within predicted forecasts.

CHAIRMAN STEIN: Thank you, Mr. Meers, for a very informative statement.

Are there any comments or questions?

MR. POSTON: I would like to ask Mr. Meers whether they anticipate chlorination as part of their expansion program?

MR. MEERS: It is very possible. It will be on the recommendation of the consulting engineers.

CHAIRMAN STEIN: Thank you, sir.

MR. KLASSEN: One other area that has been pointed out that is within the jurisdiction of the State Board, but which is not an official part of this conference is the area in Lake County.

We are not going to ask the North Shore Sanitary District to make a formal presentation. I wanted to state that Mr. Ray Anderson is here and will be available to be called on if and when any problems or questions may arise.

I merely want to state that that District has complete treatment and chlorination of the sewage going into

Lake Michigan and also the industries in that area have treatment works. There are numerous water intakes in that area that have a satisfactory raw water source and also, all of the bathing beaches that operate in that area are open and meeting up to bacterial standards.

I want to mention this because Mr. Anderson is present. Will you stand up a minute, Ray?

Mr. Chesrow made a good suggestion here. I am talking about Lake County, Illinois.

There is a Lake County, Indiana. Thank you, Colonel.

We promised to get you out of here at 12:30 and we have one short presentation we want to work in this morning.

Mr. Albert Meserow, who is the immediate past Chairman of the Great Lakes Compact Commission and the Chairman of the Illinois Delegation. Mr. Meserow, would you make a statement on behalf of the Illinois Delegation? This will then conclude the discussion for this morning.

MR. ALBERT E. MESEROW: Mr. Chairman, fellow conferees: The Great Lakes Commission is an eight-state statutory agency composed of membership of the eight Great Lake states, Illinois, being one and Indiana being one.

The Commission serves as a medium of discussion and makes recommendations on all Great Lakes problems.

Article VII of the Compact has been ratified by each of the eight Great Lakes state legislatures. It provides for the states to consider the action of the Commission with respect to recommendations on the stabilization of lake levels, measures for combating pollution, beach erosion, floods, and shore inundation; problems of navigation, fishing, power, diversions of waters and other Great Lakes problems.

So far as Illinois is concerned, several of these considerations do and can vitally effect the economic and industrial growth of our state and particularly the Chicago area as well as the potential population increase which that area can support, particularly in reference to water usage.

Illinois is dedicated to the principal of full multipurpose use of its water resources and this should apply to the waters of the Great Lakes.

We must make maximum economic use of these waters for municipal water supplies, the industrial water supplies, water for agricultural purposes, for fishing and aquatic recreational uses, for water power, navigation, and by those municipalities and industries whose adequately treated wastes are discharged to these waters.

The Delegation recognizes the importance of all of these uses, and further, that this resource is far too valuable to be dedicated primarily for one particular use.

This applies especially to the assimilation and dilution of domestic and industrial wastes in lieu of their proper treatment. It is believed that all of these uses can be compatible.

It is my further belief that within the framework of such interstate compacts as the Great Lakes Compact Commission that many problems involving the multiuse and reuse of the Great Lakes waters can and should be resolved.

I believe that in this area we can occupy an extremely important role in resolving these Great Lakes water problems and at the same time protecting and promoting the water interests of this state.

It is my belief that a uniform understanding and policies can be developed and agreed upon whereby waters from the Great Lakes can be utilized by the bordering states without involving economic, health or similar losses or problems to the various states involved.

While litigation may be necessary in resolving some of these questions, it is believed that mutually satisfactory solutions to the problems of water uses of the Great Lakes can be resolved through sound and practical statesmanship.

Illinois regards its available water resources as one of the most important factors in the economic growth for its municipalities and industries. Illinois also recognizes its mutual water problems with the other Great Lakes states and desires to solve these varied water resource problems which exist today and which can be anticipated.

It hopes to accomplish this in full cooperation with the various federal and local agencies as well as with the agencies of its sister Great Lakes states.

It is believed that through public recognition and through proper engineering, research, regulation, development, legal and sound administrative arrangements that mutual water needs can be met so far ahead as man can see.

I again wish to emphasize that I personally believe that within the framework of this Great Lakes Commission lies the ultimate amicable solution to many of the present Great Lakes water use problems and the future problems with which all states will be confronted as industry and population expand.

To this end, the Illinois Delegation of the conference pledges its active cooperation and support.

I would like, at this time, to refer the conferees to a case in a pollution situation in the same area, the lower end of Lake Michigan, which took place prior to 1943.

While I was an Assistant Attorney General of Illinois, there was a great furor about the pollution of Lake Michigan at the lower end, principally because of the industries and the four cities at the lower end of Lake Michigan.

I was instructed by the Attorney General to make an investigation which I did for over a period of a year.

I found that the pollution at that time was much greater than it is at the present time. At the Indiana Harbor Ship Canal we had pollution to the extent of samples of over one million per hundred millimeters, sometimes as high as ten million.

We found that raw sewage went on cakes of ice as far north from the Whiting area up to Wilson Avenue intake. There was a real pollution problem and fortunately, for the expert efforts of the City of Chicago and their filtration, the handling of their water, there were no epidemics but they commenced a suit in the United States Supreme Court on behalf of the State of Illinois against the State of Indiana and the four cities and seventeen national industries that were polluting the lake.

We had a meeting of the respective governors and the representatives of the Indiana industries and they came in and they admitted that they were polluting the lake.

They said they wanted to do something about it, they were willing to do something about it.

We worked out a unique method whereby each of these industries proposed the necessary abatement plans.

These plans were submitted to the engineers of the Sanitary District, Lange Donpers, Horace Rayne and Dr.

Moelmann; they examined the plans and when they approved the plans, these efforts were carried into effect by the industries.

When they were completed, the engineers inspected the treatment works and, if they were satisfactory, each of these industries were dismissed from the case in the United States Supreme Court.

This was done over a period of four or five years. The industries spent about twenty million dollars in doing it. It was done under the supervision of the United States Supreme Court Master and every three months these industries had to report their progress.

Now, I found in my investigation that these conferences, such as these were held as far back as 1890, whenever there was an outbreak of any epidemic or disease or communicable disease. A furor would take place and they would hold these conferences and the industries said, "Yes, we will do something about it", but they never did anything until they were forced to do it by Court action.

Now, it is my recommendation to these conferees that now we have the Federal Water Pollution Control Act which has all of the teeth in it which we didn't have back in 1943, which gives the Attorney General of the United States, upon recommendation of the Secretary of Health, Education, and Welfare, authority to commence a legal action in the District Courts of the United States for the purpose of securing the abatement of the pollution which they are doing.

It is my recommendation that, if the Secretary, after this conference and if they so find that these industries are polluting, that they should recommend that they abate this pollution within the time allotted under the Act and if they don't, that action, legal action, should be filed by the Attorney General of the United States, and I strongly urge that there can be no compromise with the health of the people of the City of Chicago.

Thank you.

(Applause)

CHAIRMAN STEIN: Any comments or questions?

(No response)

If not, we will stand recessed until 2:00 o'clock.

(Whereupon the proceedings in the above entitled matter were continued to 2:00 o'clock P.M. the same date).

AFTERNOON SESSION

CHAIRMAN STEIN: May we reconvene.

First, I would like to read a telegram I just received addressed to me, dated today:

> "Our Union welcomes your conferenece on lake pollution. However, on behalf of the employees we represent and the situation in Whiting, it is felt that unions such as ours should have been invited to participate and an answer shall be appreciated."

Signed "Joseph J. Sotack, President, Independent Petroleum Workers Union, Whiting, Indiana."

Mr. Klassen?

MR. KLASSEN: To continue with the State of Illinois Agencypresentations, we have within our State government, the Department of Public Works of which the Illinois Division of Waterways is a part.

This department through this division has some jurisdictions and some real interests in the waterways involved in this conference.

It is because of this and the interest of that department and its Director in this whole problem that we are scheduling at this time a presentation by our Department of Public Works and it will be given by the Director of the Department, the Honorable Francis Lorenz, who incidentally is also a member of the State Sanitary Water Board -- one of our real active members.

MR. FRANCIS LORENZ: Mr. Chairman, official conferees, ladies and gentlemen:

I am most pleased to appear before you today to present the views of the Department of Public Works and Buildings as it relates to the subject of this conference.

We are deeply concerned with the problem of pollution in Lake Michigan because the lake is our most important single water resource.

It is essential that sound management practices based upon thorough engineering analyses be applied so this resource, for the benefit of the people of the City of Chicago, the states of Illinois and Indiana and of the Nation as a whole be preserved.

The Department of Public Works and Buildings, through its director, is a voting member of the State Pollution Control Agency, the Sanitary Water Board, through the office of Chief Waterway Engineer, the Department is an official member of the Technical Advisory Committee for Water Resources.

I am pleased to reaffirm that this Department subscribes completely to the comments presented to this conference by Mr. Clarence Klassen for the Sanitary Water Board and by Mr. Ackermann for the Technical Advisory Committee for

Water Resources.

Perhaps, it would be best to first acquaint you in a general way with the scope of the authority of the Department relative to waters and water courses in Illinois.

The Department of Public Works and Buildings is a co-department of the Executive Branch of State Government and has jurisdiction and supervision over the rivers, lakes and streams of the State of Illinois and is charged with the specific responsibility of making careful investigation of such waters and water courses to prevent or remove encroachments; in this connection, title to the bed of meandered lakes in Illinois.

Lake Michigan, for example, is held in trust for the benefit of all of the people of the State, and jurisdiction in this instance is assigned to the Department of Public Works and Buildings. As a general rule, considering other than meandered bodies, title to the bed of rivers and other streams whether navigable or non-navigable, rests with the owner of the abutting properties, regardless of whether publicly or privately owned. Supervision of the waters remains with the Department, particularly, as to the collection of data relative to navigation and natural resources, the development of public reserves, the exercise of permit for the erection of structures, the development of flood control and low flow improvements, drainage and, to a specific degree, water supply.

Illinois is usually considered to follow the doctrine of riparian rights which broadly stated are the rights of the owner of land situated on a water course relative to the water, its use and the ownership of soil under the stream. The doctrine also implies the intended responsibility of the owner to refrain from interfering with or depriving other land owners, similarly situated, of the same rights.

In addition to the general police power of the state to regulate within limitations the use of water and other related activities--and the state of Illinois has several rather specific types of jurisdiction over natural water courses that are of interest here--it has the power to regulate and control fishing in all waters of the State. It has the power to control and protect all navigable waters of the state for the purpose of navigation; to control and regulate the exercise of all rights incident to the ownership of beds of all water courses in which the state holds title and to control and regulate the general use of all public waters of the state. These jurisdictions are in addition to the powers and the rights which the state enjoys as a riparian proprietor on a particular water course and such regulatory actions as the Commission of Pollution Control laws and other similar regulatory functions.

The individual riparian owner may make such reasonable use of the water as he can while it passes his land. He may use it for water supply, for navigation, for bathing, recreation, agriculture, industry or any other purpose. But, the same rule which applies in his favor also limits his rights in respect to other riparian owners with regard to water quality.

He cannot make such use of the water as to unreasonably diminish its quality or create a nuisance; neither can be discharge poisonous or noxious matter into the stream or use the stream to float away refuse if the refuse is injurious to the rights of the public or other riparian owners.

When questions arise between riparian owners, regarding the right of one to make a particular use of the water in which he may have a right common to others, the solution will generally depend upon the reasonableness of the use and the extent of the detriment to the common owner.

The evaluation of Illinois law indicates that municipal corporations or private corporations have no greater right to pollute waters than do individuals. This being the case, it should be clear that any pollution of Illinois waters, regardless of a party acting as the polluter, would automatically infringe upon the property rights of individual riparians to the body of water and therefore should not be condoned.

Illinois statutes provide that the Department of Public Works and Buildings is responsible for the development of watershed plans or resource development which include both flood flows and low flows of the streams of the watershed.

Our responsibility relative to flood flows is clear and is not particularly germane to the issue today.

The responsibilities of the Department relative to low flows has been interpreted to include augmentation of flows which are inadequate so as to maintain reasonable stream water quality. For each watershed of the state, there is a fine topography and a limited capability for the storage of dilution waters.

The Department of Public Works and Buildings is automatically concerned with the amount of pollution being directed to streams of this State because of the volume of low flow augmentation storage varies directly with the pollution delivered to the stream by industry, drainage districts or individuals.

Our efforts to develop optimum water resource plans for the basins of the State are substantially hindered by excessive requirements for dilution flow signs. These waters arrive in the stream from storage volumes within reservoirs which Michigan allocated to a different, more reimbursable purpose.

The Department does not propose that every stream in the State of Illinois shall be of sufficient quality to permit bathing or domestic consumption of the water without prior treatment.

We do feel very strongly, however, that each stream of the State does have an appropriate standard of quality which should be maintained in the vicinity of the industrial centers of Illinois. Many of the streams have already deteriorated to the point where desirable standards of quality are no longer satisfied.

In these areas, state government, principally through the Sanitary Water Board and the Department of Public Works and Buildings, is moving toward the re-establishment of the quality criteria which is believed to be desirable.

An excellent example of this procedure is the Fox River which flows through Lake County, as well as McHenry, Kane, Kendall and LaSalle Counties in Illinois.

In those areas of the State where streams are not yet polluted to the point that the acceptable standards of quality have been violated, the Sanitary Water Board is making every effort to insure that the quality does not deteriorate to a value less than a desirable standard for that particular stream.

I do not infer that stream quality standards have been vigorously applied to all of the streams of this State, but I do strongly assert that the forces of the State government are presently moving to maintain and to improve the quality of our service waters.

The report of the Department of Health, Education, and Welfare, covering the pollution of the Waters of the Grand Calumet River, the Little Calumet River, the Calumet River and the Lake Michigan, makes reference to the construction of a temporary dam on the Grand Calumet River at Columbia Avenue in Hammond, Indiana. The Department of Public Works and Buildings of the State of Illinois and, I believe, the Metropolitan Sanitary District of Greater Chicago, will both be on record as proposing the construction of this dam in such a way that the treated effluent of the Hammond, Indiana, sewage treatment plant would be excluded from the State of Illinois and would flow to Lake Michigan through the Indiana Harbor Ship Canal.

The recommendation of the Department of Public Works and Buildings is based on the foregoing precepts of Illinois law.

Observations by competent individuals have clearly shown that during the preponderance of time flow in the Grand Calumet River is from the Hammond sewage treatment plant to the Indiana Harbor Ship Canal and then into Lake Michigan. Topographic data provided by the Chicago District Office of the Corps of Engineers clearly shows a slight rise in the Grand Calumet River to substantiate the preceding statements.

It is true that the effluent from the Hammond treatment plant will constitute a slight pollutant to Lake

Michigan. It is also true that the same volume of effluent applied to the Little Calumet River, the Cal-Sag Canal and the Illinois River will constitute a much greater source of pollution because of the comparatively minuscule volume of dilution water available.

A further consideration in this regard is the burden placed upon the Sanitary Water Board in endorsing pollution requirements in Illinois, on the one hand, while accepting polluted waters from Indiana, on the other hand.

It is the position of the Department of Public Works and Buildings that this is a completely untenable proposition.

The question of pollution to Lake Michigan by effluent from the Hammond sewage treatment plant is one of academic interest. It is a fact that the pollution moving to Lake Michigan through the Indiana Harbor Ship Canal originates primarily in the Grand Calumet River easterly of the Canal. This flow which is of industrial origin moves westerly in the Grand Calumet River to the Indiana Harbor Ship Canal, at which point it turns in a northerly direction and moves to Lake Michigan.

It is because of the large volume of this grossly polluted flow that effluent from the Hammond Sewage Treatment plant is sometimes noted to move in a westerly direction towards Illinois.

The Department of Public Works and Buildings of the State of Illinois joins with the Metropolitan Sanitary District of Greater Chicago in urging that the wastes from the Hammond Sewage Treatment Plant not be permitted to flow into the State of Illinois.

It is our opinion that the construction of this dam by the Corps of Engineers as part of the Cal-Sag navigation improvement has not properly involved the Department of Health, Education, and Welfare at this time. The dam does not exist at the present time and while reports show that pollution does originate from the Hammond sewage treatment plant, data are not available to show that this undesirable material would be more acceptable in the inland waterway system of Illinois than it would be in Lake Michigan.

It is our understanding that under the Public Law 660, the Federal Water Pollution Control Act, the Department of Health, Education, and Welfare, has a corrective jurisdiction relative to matters such as the Barrier Dam only after a hearing to establish pollution has been held.

We further believe that the law clearly indicates such a hearing would be necessary subsequent to this conference.

Thank you very much, ladies and gentlemen.

CHAIRMAN STEIN: Thank you, Mr. Lorenz.

Are there any comments or questions?

(No response)

If not, thank you very much for your statement.

MR. KLASSEN: The Illinois State Medical Society has prepared a statement for the record which will not be presented at this time, but will go into the record. It is a general statement concerning its interests in clean waters in this area.

CHAIRMAN STEIN: You have a copy of that statement?

MR. KLASSEN: No.

CHAIRMAN STEIN: Well, would that be made available?

MR. KLASSEN: It will be mailed.

CHAIRMAN STEIN: Without any objection, that will be inserted at this point.

ILLINOIS STATE MEDICAL SOCIETY

RESOLUTION ON WATER POLLUTION

WHEREAS, any unnecessary discharge of sewage and industrial wastes, either treated or untreated, into underground or surface sources of domestic drinking water supplies is contrary to the basic concepts of disease prevention, and

WHEREAS, prevention of such pollution is becoming increasingly important because of the multiplicity of potential pollutants especially those involving organic and inorganic chemicals and viruses, and

WHEREAS, methods for the identification of many such substances and the evaluation of their potential health hazards at present is either lacking or incomplete, therefore, be it

RESOLVED, that the Illinois State Medical Society go on record as being opposed to any unnecessary discharge of wastes that will result in the degradation of drinking water supply resources, or the impairment of water used for bathing and swimming.

Passed by the Illinois State Medical Society, Board of Trustees, on January 17, 1965.

MR. KLASSEN: Next, the Cook County Department of Public Health has a real jurisdictional interest in this particular area, particularly that area in Cook County outside of the City of Chicago and at this time a statement will be presented by the Health Officer for the Cook County Department of Public Health, Dr. John B. Hall.

DR. JOHN B. HALL: Mr. Chairman, conferees, ladies and gentlemen:

Any pollution of Lake Michigan which affects the potability of the water supply of the City of Chicago also affects the water supply of 56 communities in suburban Cook County (with a total population of approximately 750,000 persons) who procure their water from the City of Chicago, and five other communities which use Lake Michigan water from other directions with a population of approximately 150,000.

PUBLIC WATER SUPPLIES UNDER THE JURISDICTION OF THE COOK COUNTY DEPARTMENT OF PUBLIC HEALTH OBTAINING LAKE MICHIGAN WATER THRU CHICAGO

		Population
1.	Alsip	4,300
2.	Berkeley	7,600
3.	Berwyn	54,224
4.	Blue Island	20,500
5.	Broadview	9,000
6.	Brookfield	20,429
7.	Burnham	2,478
8.	Calumet City	26,000
9.	Calumet Park	9,200
10.	Cicero	70,600
11.	Dixmoor	3,400
12.	Dolton	19,800
13.	East Hazelcrest	1,500
14.	Elmwood Park	24,200
15.	Evergreen Park	25,300
16.	Forest Park	14,900
17.	Franklin Park	18,700
18.	Golf	430
19.	Harvey	30,800
20.	Harwood Heights	6,300
21.	Hazel Crest	8,200
22.	Hillside	8,500
23.	Hodgkins	1,200
24.	Hometown	7,500
25.	LaGrange Park	14,700
26.	Lincolnwood	12,200
27.	Lyons	11,100
28.	Markham	12,300
29.	Maywood	27,700
30.	McCook	470
31.	Melrose Park	23,800
32.	Merrionette Park	2,400
33.	Midlothian	9,000
34.	Morton Grove	22,100
35.	Niles	26,000
36.	Norridge	14,700
37.	Northlake	12,900
38.	North Riverside	8,400
39.	Oak Lawn	33,100
40.	Park Ridge	36,700
41.	Phoenix	4,700
42.	Posen	4,800
43.	Riverdale	13,000

		Population
44.	River Forest	13,000
45.	River Grove	8,600
46.	Riverside	9,500
47.	Robbins	8,200
48.	Rosemont	1,700
49.	Schiller Park	6,200
50.	South Holland	12,700
51.	Stone Park	5,000
52.	Summit (Argo)	11,700
53.	Westchester	18,700
54.	Canfield Community Service (Norwood)	1,000
55.	Leyden Township (Leyden)	8,000
56.	Monterey Manor Subdivision (Norwood)	850

ADDITIONAL PUBLIC WATER SUPPLIES FROM LAKE MICHIGAN, OTHER THAN CHICAGO

Glenview	22,400	From Winnetka
Lansing	19,500	From Hammond, Indiana
Northbrook	12,300	Directly from Lake Michigan.
Skokie	66,800	From Evanston
Wilmette	29,900	Directly from Lake Michigan.

The constant reduction in the water table in this metropolitan area has driven more and more communities to seek the waters of Lake Michigan. There have been many plans under consideration and it can be said that this movement will spread so that in the foreseeable future the total population of this metropolitan area will be deriving its water supply from Lake Michigan.

At the present time, we are talking about the water supply of 4.5 million people in the State of Illinois, then we will be talking about a population of more than 7 million persons.

Any problems that the City of Chicago Water Purification Division has producing a safe water supply for the citizens of the City of Chicago is reflected in the hazards possible to the other users of this water.

The reduction of the pollution in this area of Lake Michigan is of prime importance in protecting the health of the citizens of this metropolitan area. Waste disposal in waterways must be rigidly controlled. Performance standards must be established and met. Cost factors should be subordinate to the health and welfare of the citizens dependent on this water supply.

Part of the problem is pollution of the Little Calumet River. Reference is made to this because it directly affects the health and welfare of the citizens of suburban Cook County under the jurisdiction of this Department. This pollution has been of such extent as to render these streams almost totally unfit for recreation.

Recreation and public health are inexorably wedded together. Fishing, boating, water skiing and even walking along the banks of these streams are denied to the public since contact with these polluted waters is a public health hazard. Adults can become educated and prevailed upon to leave the streams alone, but children are drawn to them and, through no fault of their own, can suffer the effect of industrial neglect.

Aesthetically these streams become eyesores. Because of the heavy pollution, there is little interest on the part of the resident public to improve them, and in time they become clogged, overgrown with vegetation and repositories for junk.

Through the Cook County and the Metroplitan Sanitary District of Greater Chicago's program of stream cleaning, efforts are being made to reclaim these streams. However, stream cleaning, although an excellent thing in itself, does not eliminate the potential health hazard of pollution.

Public interest and pride in the stream cannot be generated as long as the pollution remains. In addition, the mere mechanics of stream cleaning involves individual hand work and, in a polluted stream, this is a health hazard to the worker.

The health of the public in the vicinity of these streams can be affected by other means. Insects and rodents that breed in and along these polluted waters become carriers of disease. Dysentery of various types can possibly be transmitted to man. Livestock damage is not beyond being caused by polluted waters.

We have cases on record where individual wells become polluted from these streams where the water-bearing aquifer was at or near the surface. In the Alsip area, numerous wells became polluted as a result of a disturbance in the bed of the Calumet-Sag Channel. A survey in 1962 of 55 homes in this area showed that 24 of the 55 wells tested contained varying amounts of pollutional bacteria.

There can be no compromise between public health and stream pollution. We in Cook County have demanded that our residents do not pollute the streams, we can ask no less from others.

CHAIRMAN STEIN: Thank you, Dr. Hall.

Are there any questions or comments?

(No response)

If not, thank you very much for your statement.

MR. KLASSEN: Several years ago we had a visitor to our office for most of the summer from behind the Iron Curtain and after he had been with us several months attending meetings and hearings, when he left I said, "What are some of the things that have been high points in your visit?"

"Well," he said, "I was impressed by the fact that at your public meetings ordinary people can get up and criticize Government, criticize industry and criticize other people and this is a right, privilege that apparently you people have."

Following here are a series of several presentations, some of them a very short statement. But they are by people, by organizations that are, you might say, the users and on the receiving end of pollution and interested in this particular problem.

Some have been invited to participate, some requested the appearance and the first one of these that we are presenting is the Alderman from the Fifth Ward in Chicago, Leon Despres.

CHAIRMAN STEIN: While Mr. Despres is coming up, I don't know how it is in Springfield, but in Washington the people don't have to wait for public meetings, they seem to criticize us all the time.

And, I think the beauty of our Government is not just that ordinary people can criticize you, but some of the biggest corporations can criticize you, too,

MR. KLASSEN: I will say maybe there is more to criticize in Washington than in Springfield.

(Laughter) (Applause)

CHAIRMAN STEIN: That might be, but in my visits, I missed it.

MR. POSTON: I would like to comment, Mr. Chairman, to the effect that I thought the Public Health Service had received a lot of accolades today and yesterday and it makes me feel real good.

I think probably our Chairman is a little more critical of us than some of the local people.

CHAIRMAN STEIN: Mr. Despres.

MR. LEON M. DESPRES: Mr. Chairman, before I start, I would like to ask if I could be permitted to file for the record the statement I was requested to give you from the Chicago Heritage Committee, Thomas Stauffer, Chairman. It is a brief statement, if I may file it?

CHAIRMAN STEIN: Without objection, that will be included in the record. The conferees can look at that.

STATEMENT OF CHICAGO HERITAGE COMMITTEE

We urge TOTAL control of pollution for the metropolitan area. Such control is technologically possible; that it is both desirable and necessary is beyond debate.

We believe that this should be achieved by legal control of the sources of pollution with costs to be borne, in the case of industrial pollution, by private enterprise and the market, in accordance with American tradition, rather than by public administration with costs covered by taxes.

We believe that there is considerable experience showing that such control is often even profitable; however, if it is not, the cost will be passed to consumers equally by all competitors.

MR. DESPRES: Mr. Chairman, ladies and gentlemen:

I appear here as an Alderman of the City of Chicago elected from Chicago's Fifth Ward, which extends along Lake Michigan between 51st and 67th Streets. The 75,000 persons in my ward share the general concern of all Chicagoans in our Lake and hold a special concern because we live directly next to Lake Michigan.

I have come here to urge the Secretary to take the strongest and most effective measures possible to end pollution of lake water. The report on Lake Michigan made by the Public Health Service for this conference has horrified all of us who have studied it.

It shows that the danger to lake water is not ten years off, not five years off, but immediate and present. It shows that sewage and industrial wastes are doing irreversible damage to the lake; that municipalities and boats are pouring in sewage wastes daily; and that the steel, oil, and chemical plants are daily pouring vast, deadly industrial wastes into our end of the lake.

The report confirms the disturbing personal observations we have made as laymen. In December 1964, for instance, we found millions of mysterious polyethylene pellets washed up on our two miles of breakwater. Later we learned that they represented just one flushing from a chemical plant, and we learned that on the Michigan shore part of the same flushing made up 30 or 40 miles of windrows, plus an incalculable area of lake bottom.

Another disturbing instance to us has been the personal observation of our portion of the Lake bottom made by a constituent who does amateur skin-diving and has kept a careful four-year journal of underwater observations. He reports one overriding observation -- the startling growth in length and size of algae.

The Public Health Service report tells us what our own observations hinted at -- that the Lake and its water are being fatally degraded; that bloodworms, sludgeworms, and fingernail clams have all but taken over the Lake bottom near us; that the Lake's growing nitrogen content has almost reached the point where algae finally take over the lakefront and bathing and impede filtration; that sewage and industrial wastes tax Chicago's great filtration plant beyond its power to purify completely; and that our water is receiving massive chemicals, metals, and poisons whose cumulative biological effect may be massively disastrous. What we are suffering from is inadequate control of the effects of population increase and industrial advance. Nobody knows how long our filtration will be effective if contamination increases.

Since years of conscientious preventive efforts by the City of Chicago, both alone and in cooperation with industry and with local governments in Indiana and Illinois, have ended in increased Lake pollution, I urge strong measures now by the Federal Government, which alone has effective power to act.

We need help to stop the dumping of sewage from 325,000 people.

We need help to stop dumping of industrial wastes. Industry stands to gain enormously if it ends water pollution. We know that some of the pollutants can be turned into valuable by-products, as industries in the Pacific Northwest and German Ruhr learned after they worked with government to stop pollution.

Some dumping of pollutants is just a bad habit which can be stopped by storage or reprocessing. All pollution will eventually destroy industry, as pollution goes on to destroy the environment and means of life which industry needs to survive. Since industry, although it stands to lose heavily from general water pollution, cannot legislate rules against it, the Federal Government has the responsibility to do so.

The measures we need are measures to end pollution of Lake Michigan. There is a danger that the Secretary may be tempted to define "standards" and tolerate all pollution down to a fixed point. Such a procedure would encourage pollution; allow irreversible damage; and permit the continued entrance into the lake of sewage, chemicals, metals and solid wastes whose cumulative effect on our population could be devastating. Our need is to stop pollution at the sources.

We need help also from the Secretary in a continuing research program; in continuing help to muncipalities and industries; and especially in a continuing program of imaginative education designed to build public awareness of water pollution, public participation to end it, and public enthusiasm for an improved environment.

We ask urgently for help, and we promise full support.

Thank you.

CHAIRMAN STEIN: Thank you, Mr. Despres.

Any comments or questions?

(No response)

Thank you very much for your statement, sir.

MR. KLASSEN: Next, we have an Alderman of the Sixth Ward, but not from the City of Chicago -- from Calumet City.

And, very interestingly enough, this Alderman is also a member of the Clean Streams Committee and active in that area, and, of particular interest, she is a lady.

I want to present now, Mrs. Sarah Mase, the Alderman of the Sixth Ward, from Calumet City.

MRS. SARAH MASE: Conferees, Mr. Chairman, ladies and gentlemen:

I do have a short statement that has been released and I am going to read that. Then I would like to make a couple of additional remarks.

This is a statement on the subject of pollution of the Grand and Little Calumet Rivers and their tributaries with relation to my community and my City.

I am a much smaller municipality; I have only 27,500. But we are directly concerned because we are bordered by the Grand Calumet on the north and the Little Calumet on the south. And if you will look on the map, I am concerned with the area where the dotted line crosses the pink map or the Little Calumet River, just on the inner side of the River across from Lansing - this white area here. Calumet City lies in that area long the State line. We have been plagued with flooding and pollution for the fifteen years that I have lived there in that suburban community.

I want to read from this.

It says, Calumet City is located in the southeast corner of Cook County, bounded on the north by the Grand Calumet River, on the east by the State of Indiana, on the south by the Little Calumet River, and west by the Calumet Expressway. We are plagued by two interstate polluted rivers along our borders.

The Grand Calumet River pollution is caused primarily by industries, but the Little Calumet River is polluted both by industry and municipalities. The Grand Calumet runs through industrial sections and is polluted heavily by industrial wastes and raw sewage. The Little Calumet River runs through a residential section of our City and is subject to pollution from Indiana towns without treatment facilities.

Our residents along the River suffer from obnoxious odors during warm weather. Pollution has been so bad that the paint on houses and garages has been peeling and changing color. Both rivers flow in a westerly direction from Indiana.

Our people, through popular subscription, built dikes along the river to protect from flooding. To date the dikes have stopped overflow during heavy rainfall, but the pollution is another problem that has grown much worse each year.

In dry weather, little water flows, and such flow is very sluggish, even stagnant. The hot sun causes river bottom sludge to be exposed.

If you ever watched it -- may I interject here -- when the waters are way down, the sludge is drawn up by the hot sun. It is a strange phenomenon but the smell is very strange, too, I assure you.

No recreational areas are located near the River because of such conditions. Children are forbidden to play near the streams because of health hazards. What could be a nice clean river with parks and playgrounds along its banks is a narrow, crooked polluted stream.

Pollution problems can only be solved through the fullest cooperation of and between industries, municipalities, county, state and Federal Government. Because sludge has been building up over a long period of time, perhaps, we should look to widening, straightening, and dredging our smaller polluted streams.

I want to interject here that the one time we tried to have a committee, an interstate committee, and we called it the Illiana Waterwaste Drainage and Flood Control Committee, and I was Chairman, and Mr. Giannini of Indiana, who is here today, was the Secretary -- but because of jurisdictional problems, every time we went to the Indiana side, we were told they had no jurisdiction in Illinois, and every time we went to the Illinois side, we were told they had no jurisdiction in Indiana.

So, before I close this brief message, I would like to make a suggestion, if I may take the liberty, that a committee, an interstate committee, along with the Federal Government, form a commission or committee -- I know we are overloaded with commissions and committees today, but they do get things done--that they be formed to combat this flood pollution and to just at least keep the populace aware of what is going on, and informed people generally are better residents and better citizens. I find it that way and I would like to make that suggestion.

I want to close by saying: Our sincere appreciation for the privilege of speaking for the City of Calumet and the Calumet City Flood and Pollution Control Committee. Also, our thanks to the Metropolitan Sanitary District, the Pennsylvania Railroad, and the Department of Public Health for their continued interest and aid in keeping our streams as clean as possible in spite of pollution problems.

I want to commend the United States Department of Health, Education, and Welfare, on their comprehensive report, the pollution report. I have had a lot of very fine information out of that. It has come in handy, really, to our local people.

Thank you.

CHAIRMAN STEIN: Thank you, Mrs. Mays--M-A-Y-S?

Are there any comments?

MRS. MASE: It is Mase.

CHAIRMAN STEIN: M-A-S-E, that is my fault.

To follow up, we will show you how American this is and what a wonderful conference we have -- I would like to just go off-the-record for a minute to read a post card.

(Discussion off the record)

MR. KLASSEN: We have invited the Mayor of Joliet. It is slightly outside the area of this conference, but flowing past and through the City of Joliet is the waterway which does take some of the wastes that come from Indiana and we know the Mayor is a person that is vitally interested in the water supply needs of his community and hopes that someday he may utilize the water course that flows through Joliet as a source of water supply and, in this context, we have a brief statement from Mayor Berlinsky of Joliet.

MR. MORRICE BERLINSKY: Mr. Chairman, the Honorable Murray Stein, and distinguished co-conferees:

I would like to preface my remarks by saying that the citizens of Joliet are most grateful for the opportunity for our opinion to be read into the record and made a permanent part of the record of this conference.

Our statement is addressed to Mr. Klassen.

As Mayor of the City of Joliet, I wish to express the fact that our City is gratified with the attention being directed by your Department and by the United States Public Health Service to the problem of water pollution.

We share with you, the state and the region and the Nation, the concern relative to pollution of our waters.

The problem of pollution concerns us not only from the standpoint of public health, but also from the standpoint of water resources needed to support a growing urban area such as Joliet. The Lower Des Plaines Valley Water Resources Committee, a group made up of representatives from the various governmental jurisdictions and industry in this region, had conducted by Stanley Engineering Studies, a study of water resources in the Lower Des Plaines Valley.

This study shows that the Joliet-Lockport-Lemont area will face a severe water shortage unless a major new water supply is developed, the projected water deficiencies in the Lower Des Plaines Valley to be ten million gallons per day in ten years. They forecast the fact that our existing source of water supply, ground water, will be inadequate for public and industrial needs.

Therefore, we are especially concerned with the pollution of the Des Plaines River and the Illinois Deep Waterway because this represents to us the resource from which this area can best obtain an adequate supply of water to continue the growth and prosperity of this region.

We submit to you and the United States Public Health Service an urgent plea to act within the full extent of your power and authority to eliminate pollution in the Des Plaines River, in Illinois Deep Waterway, so that Joliet and their region can utilize this water resource to meet the growing needs of this area.

We express the hope that your power and

authority and the power and authority of the United States Public Health hold the point until the appropriate state or local agency does something about it and sometimes I will admit they are pointing at us.

(Laughter)

The first and the most active of these groups of unique organizations is the Cook County Clean Streams Committee, and they are so organized that they are in basins. The Chairman of the Thorn Creek watershed, which is in the southern part of Cook County, is going to present their thoughts here, and the interests of the Cook County Clean Streams Committee on the particular problem that is before us.

I present to you the Chairman of the Thorn Creek Watershed, Mr. Joseph Chantigney. Mr. Chantigney.

MR. JOSEPH CHANTIGNEY: Mr. Chairman, conferees, ladies and gentlemen:

I want to assure you all this stuff I brought up I won't be reading it all. It would take all day.

My name is Joseph T. Chantigney. My home address is 14823 Evers Avenue, Dolton, Illinois. I am the Chairman of the Thorn Creek-Calumet Committee of the Cook County Clean Streams Committee.

With me today are two cochairmen on this committee, Mr. Chester Magon and Mr. Ben Traficano.

Mr. Klassen, you invited three more members of our committee whom I would like to introduce before I commence. It will only take a minute.

Our retiring General Chairman, Mr. Duke E. Read, and our newly appointed General Chairman, Mr. Don Maskey.

CHAIRMAN STEIN: You might explain that these are purely volunteers.

MR. CHANTIGNEY: Yes, it is in my statement.

CHAIRMAN STEIN: All right.

MR. CHANTIGNEY: Did Mr. Donald Maskey stand? Please stand.

And, our Executive Secretary, Mr. Lee Bradish, in the back.

I might also say that we are just one of seven committees on the Cook County Clean Streams and we are here because this happens to be our area of responsibility. I would like to point this out on the map to you, ladies and gentlemen.

Our map is very small. We will use the large one then. We extend from 76th Street on the south side all the way over to Blue Island, west all the way south to Cook County line and over to the Indiana State Lines. This is our boundary. Thank you.

The Cook County Clean Streams Committee was formed in 1953 by the Cook County Board of Forest Preserve Commissioners for the express purpose of eliminating pollution in the streams and rivers of Cook County. The Thorn Creek-Calumet Committee serves the area south of 76th Street in Chicago, south, east and west to the Cook County line. Over three million persons reside in this area. All members who serve on this Committee are volunteer workers. Meetings are held monthly. They are open to the public.

For several years I have been interested in the problem of water pollution. It is my opinion, which is shared by other members of this Committee, that Federal assistance is necessary, at this time, to correct the existing conditions of pollution in Lake Calumet, Lake Michigan, the waters of the Grand Calumet River, the Little Calumet River, Wolf Lake, and their tributaries. Existing state laws in Illinois and Indiana have not corrected this condition.

We believe that municipal sewage and industrial wastes, treated to varying degrees, are the principal pollutional materials discharged into these waters. Other wastes discharged intermittently may have serious local effects or may cause temporary excessive pollution. Among these wastes are accidental spills from storage tanks and barges, combined sewer overflows, wastes from lake vessels, barge tows, and pleasure craft, and material from dredging operations.

Our belief is supported by exhibits listed below: resolutions adopted by numerous municipalities in southern Cook County, copies of which are attached, which their officials have asked me to present to you; water samples taken from these bodies of water and analysis made by the Illinois Department of Public Health; and a motion picture film taken by my cochairman, Chester Magon, aboard a Coast Guard boat in Lake Michigan, and the Indiana Harbor Ship Canal, on February 11, 1965, which I will present to you today.

Our first thirteen exhibits are reports on water samples taken in my presence, by Mr. A. Brantizky, Engineer, Cook County Department of Public Health. I will not elaborate on all of these as I am not an engineer or a chemist.

I will merely touch on the first two samples but I will submit the rest for the record, so you gentlemen can look them over at your leisure.

Sample Exhibit #1, a sample taken from the Grand Calumet River at the Illinois-Indiana State Line, January 22, 1965. Pollution found. Illinois Department of Public Health Laboratory File#15176.

This sample showed that approximately one-third of the Grand Calumet was raw sewage.

Exhibit #2, a sample taken from the Little Calumet River at the Illinois-Indiana State Line, January 22, 1965. Pollution found. Illinois Department of Public Health Laboratory File #15177.

Exhibit #3, sample taken February 5, 1965, from the Little Calumet River at the Illinois-Indiana State Line.

Pollution found. Illinois Department of Public Health Laboratory File #15860.

Exhibit #4, sample taken February 5, 1965, from the Grand Calumet River at the Illinois-Indiana State Line. Pollution found. Illinois Department of Public Health Laboratory File #15861.

Exhibit #5, sample taken February 11, 1965, from Lake Michigan at location indicated on report. Pollution found. Illinois Department of Public Health Laboratory File #16182.

Exhibit #6, sample taken February 11, 1965, in Lake Michigan, at location indicated. Pollution found. Illinois Department of Public Health Laboratory File #16183.

Exhibit #7, sample taken February 11, 1965, in Lake Michigan, at location indicated. Pollution found. Illinois Department of Public Health Laboratory File #16184.

Exhibit #8, sample taken February 11, 1965, in Lake Michigan, at location indicated. Pollution found. Illinois Department of Public Health Laboratory File #16185.

Exhibit #9, sample taken February 11, 1965, in Lake Michigan, at location indicated. Pollution found. Illinois Department of Public Health Laboratory File #16186.

Exhibit #10, sample taken in Lake Michigan, February 11, 1965, at located indicated. Pollution found. Illinois Department of Public Health Laboratory File #16187.

Exhibit #11, sample taken from Lake Michigan February 11, 1965, at location indicated. Pollution found. Illinois Department of Public Health Laboratory File #16188.

Exhibit #12, sample taken from Lake Michigan, February 11, 1965, at location indicated. Pollution found. Illinois Department of Public Health Laboratory File #16189.

Exhibit #13, sample taken from Lake Michigan, on February 11, 1965, at location indicated. Pollution found. Illinois Department of Public Health Laboratory File #16190.

I will submit a picture to you for just the Committee to look at, I wouldn't want the ladies to see this.

Also, I will not elaborate on the samples of the lake, as I said earlier, I will let you just read these over.

CHAIRMAN STEIN: We show these at our hearings all the time.

(Laughter)

MR. CHANTIGNEY: This is my first one I ever attended.

CHAIRMAN STEIN: This is just a conference.

MR. CHANTIGNEY: The following exhibits are resolutions adopted by legislative bodies of cities and villages in southern Cook County, Illinois, which they have asked me to present to you, for the purpose of recording their protest to the pollution of Lake Michigan because of "its interference with its use as drinking water".

These cities are supplied from Lake Michigan. I might point out that not all of them, but most of them, and I will just read the cities that gave me a resolution in order to save time: Calumet City, Chicago Heights, Harvey, Riverdale, South Chicago Heights, Park Forest, Phoenix, Homewood, Crete Dolton, East Hazel Crest, Worth, Hazel Crest.

Also is attached a resolution adopted by the Tents 'N Trailers, Chapter of the National Campers and Hikers Association in which they protest the pollution of the bodies of water under consideration today. Their letter of protest which they have asked me to present to you is marked as our Exhibit #26.

As our Exhibit #29, we have attached petitions containing over 5,000 signatures of persons who desire to be recorded as protesting the pollution of Lake Michigan and the other bodies of water, the subject of this hearing.

We thank Mr. Klassen, Chief Sanitary Engineer, for the Illinois Department of Public Health, for permission previously granted, to show a film taken on Lake Michigan on February 11, 1965, which not only shows the taking of samples of water referred to in our exhibits, numbers 5 through 13, but also shows the oil slick and other pollution floating on the lake and the smoke pollution from the industries which contribute pollution to the water also. This film will follow the presentation of this report, but I would like to show it at this time, please.

CHAIRMAN STEIN: Go right ahead.

MR. MAGON: This is the title of our film.

Here we are at the Coast Guard Station in Calumet Harbor. We are bringing our sample bottles aboard.

The gentleman coming down the ladder now is Mr. Slitzer with some of the sample bottles.

This is the deck hand who was throwing off the forward anchor line or mooring line.

This is the shot of the Coast Guard Station and here's the harbor leading out from the Coast Guard Station and in the background you see Calumet Beach Coast Guard Station taken from a distance.

Here's a shot of the State Line Generating Plant.

This is a view looking toward Indiana Harbor.

I might say it was a little bit choppy that day.

This is a view looking back at United States Steel in South Chicago.

Here is another shot of the Coast Guard Station.

Here we are passing the Hammond Water Intake Crib.

This is a view looking at Indiana Harbor.

This is Standard Oil in East Chicago.

Now, here is the mouth of the Indiana Harbor breakwater.

Here you can distinguish the color of Lake Michigan upper topside and the lower one which is the effluent flowing or polluted water flowing out of Indiana Harbor.

Here we are coming into the breakwater.

In the back you see the smoke pollution of Youngtown Sheet and Tube.

Here is the first sample we are taking right at the mouth of the Harbor.

Our cochairman, Ben Traficano, is doing the sampling and our Chairman, Mr. Chantigney, is capping the bottle.

This is Mr. Slitzer. He is the President of the Izaak Walton League.

Mr. Traficano was on the right side of the screen here.

We are coming into the Indiana Harbor of Indiana Harbor.

If you will notice this breakwater, you will see the heavy saturation of oil on the breakwater.

The next shots are something you will see, which we took in Indiana Harbor Inter-channel itself.

Here you see the formations of oil inside the Harbor.

I might state that the entire Harbor this day was full of this oil.

Here we are taking another test grab for analysis.

That is Mr. Traficano, co-chairman.

Here you see another shot of oil on the surface.

That was one of the photographers from a newspaper.

This is the west side of the channel looking toward the Youngstown Sheet and Tube Company and here is another one toward Inland Steel.

If you will notice that the water line of this ship, all of these ships, the saturation of oil which is collected on the hull of the boat, this is a view looking at Inland Steel.

You can also see the oil on the docks.

Now, here is the outfall which you have seen yesterday from the air. You will see the oil here in the foreground.

These are twin discharges of Youngstown Sheet and Tube.

Here is one looking at Inland Steel.

If you notice the heavy saturation of oil at the stern of the ship.

Here you see the pilings of the river are just saturated with oil.

This is a close-up of one of the outfalls.

Now, here is a heavy concentration of oil which is also present in the Harbor.

The next shot you will see is an oil slick which is approximately 25 to 30 feet wide and extends the full length of the ship.

There is another oil slick and that extends the full length of the ship.

Here is a view looking back at the canal harbor, and we are under way to take a test grab, a little bit west of the mouth of the river or the harbor channel.

This is just outside of the harbor breakwater and a little bit to the west of it.

Here the water is a little bit cleaner.

That is Mr. Traficano. He is taking another test sample.

That is our Chairman, Mr. Chantigney, capping the bottle.

Here we are leaving Indiana Harbor and in the background you see the steam water of the oil industry which are in East Chicago.

From here we are under way to take a test sample of the Lever Brothers Company in the northern part of Indiana in Lake Michigan.

That is Mr. Norman Patch, photographer, on the left.

This is Mr. Dick Phenol. He is the State Director of the Izaak Walton League.

The gentleman in the background was Mr. A. Brantizsky, from the Cook County Department of Public Health.

This is a picture of myself. It was kind of cold out there that day, so I took my hunting jacket along.

This is the mast of the Coast Guard cutter.

That is Mr. Tullis, again.

This is a shot of Lever Brothers, taken from Lake Michigan.

Here we made a chemical analysis of the water and also one for bacteria.

This is Mr. Brantizsky from the Cook County Department of Health, taking an analysis of the water.

(Laughter)

Well, he made it.

Here is Mr. Traficano checking for a bacteria test. He got his dip stick in there, bringing up the plastic bottle.

Here we are under way again for Calumet Harbor Coast Guard Station.

That is the back of the jacket of Mr. Tullis of the Coast Guard.

(Laughter)

This is another shot of the Coast Guard Engineer aboard.

Here again we are back at the Calumet Beach, that you see in the background, appearing between Calumet Beach and Mutchins Beach.

The Coast Guard lookout tower and here we are approaching the Coast Guard Harbor.

Here is a mallard duck which you have seen in the Calumet Harbor, which you don't see in any Indiana Harbor at all.

Here we are taking off all of our equipment which we brought with us.

There is the gangplank being thrown over to the Coast Guard Cutter.

Here is a shot of the Coast Guard Commander, Mr. Caffey.

Mr. Chantigney is on the left and thanking him for the cooperation his Coast Guard rendered us.

Here is a shot of the Republic Steel in South Chicago.

There is a dark liquid you see coming out of the outfalls. An hour and a half before this picture was taken, we stood on top of the outfall and we could see the visible discharge of rainbow colors of oil coming into the river.

It formed a pocket on the west side of the river and this is what developed from it -- a heavy oil slick. The current was moving to the right real slow.

There was a northeast wind and the outflow discharge ran out into the river.

Now, here is something taken at Swift Fertilizer.

This is an ammonia caldron in my estimation.

The discharge is approximately 100 yards to the south, right here into the Grand Calumet River.

To the left is a dike which is supposed to hold all of this pollution back, which was wide open.

Two months previous to this film, we looked at the dike there and there was a red colored water in there and it is all drained out now.

There is another discharge close to this ammonia, which when mixed with it, turned a milky white as you see right here.

And the next shot will show you where the other discharge was coming from.

It is kind of hidden by weeds, a milky white color it turned to.

That flows into the Grand Calumet River.

This is another picture of the dike which is empty, the settling basin.

It was kind of gloomy and drizzling. We took this picture here in the afternoon.

Here is a picture of the hidden discharge which mixed with the ammonia turned white, hidden in the middle of their weeds.

This concludes the report on the film. Thank you.

CHAIRMAN STEIN: Thank you.

Are there any comments or questions?

MR. CHANTIGNEY: Thank you, Mr. Magon.

Mr. Stein, I would like to also present one more statement from a member of my Committee who won't be able to read it, but we would like to present this as a statement for the record.

CHAIRMAN STEIN: Without an objection, that will be included.

MR. CHANTIGNEY: A statement from Mr. John Kelly, thank you very much.

CHAIRMAN STEIN: Pass that among the conferees.

MR. CHANTIGNEY: Yes.

"My name is John T. Kelly. My address is 9037 Kingston Avenue, Chicago, Illinois. I represent the Southeast Chapter of the Illinois Federation of Sportsmen's Clubs. We are a not-for-profit corporation operating under the laws of the State of Illinois.

"The Southeast Sportsmen's Club was organized over 25 years ago, and now has a membership of 370 persons residing in Cook County, Illinois, and Lake County, Indiana. The purpose of our organization is: to work for the conservation and the restoration of our wildlife and natural resources, to work for improvement in the lakes and rivers of Illinois, and to provide better fishing and hunting for the users of these waters.

"The membership of the Southeast Sportsmen's Club has been active for the past 18 years in reporting pollution of Lake Michigan and Wolf Lake to various governmental agencies.

"It is our belief that these waters are still polluted. To support this belief we offer a number of exhibits indicating pollution over a period of the last 18 years. These exhibits, briefly summarized are: replies received to letters seeking information and making complaints about apparent pollution conditions in these bodies of water, some being news stories, the others editorials by the editors.

"It is our belief that, due to the interstate movement of the pollution in these bodies of water, that the laws of Illinois and Indiana have proven ineffective, or this condition would not exist, therefore, we ask immediate positive action by the Federal Government.

"Exhibits summarized below, numbers 1 through 5, pertain to Wolf Lake in Illinois and Indiana. This pollution enters the Wolf Lake from the Lever Brothers plant in Hammond, Indiana, and flows into Wolf Lake in Indiana and then into Wolf Lake in Illinois, the bodies of water being divided by an imaginary line through the center of this lake.

"Exhibit #1. A letter to John T. Kelly from Mr. B. A. Poole, Technical Secretary, Stream Pollution Control Board of Indiana, dated September 19, 1947. Excerpt: 'It is acknowledged that the waste from Lever Brothers going into the lake is large in volume and contains sludge deposits, etc.'

"Exhibit #2. Another letter to John T. Kelly from Mr. B. A. Poole, dated November 14, 1951. Excerpt: 'Lever Brothers has done some construction work in their plant which is expected to reduce the pollution load going into Wolf Lake'

"Exhibit #3. A letter to John T. Kelly from Mr. Oyler, Plant Manager of Lever Brothers in Hammond, Indiana. Excerpt: 'Lever Brothers places 10,000,000 gallons of water a day, Monday through Friday, and 2,000,000 gallons of water on Saturday and Sunday into Wolf Lake.' He reports this water is 'treated'.

"Exhibit #4. Two newspaper articles on a single sheet of paper. Article #1, titled WOLF LAKE HEARING UNDER WAY, was taken from the Hammond Times, dated January 31, 1962, and reports residents of that state were in attendance at a public hearing being held by the Indiana Stream Pollution Control Board in Indianapolis, where they were protesting odors and unsightly wastes in Wolf Lake.

"Article #2, titled LEVER BROTHERS DENY LAKE POLLUTION was published in the Southeast Economist, February 8, 1962, in which the company officials admit discharging water into Wolf Lake but state it is "treated" and not harmful.

"Exhibit #5: A letter to John T. Kelly from Mr. Peter Witham, Deputy Attorney General, State of Indiana, dated June 4, 1962. Excerpt: 'the hearing officer, Mr. Anson S. Thomas, Chairman of the Indiana Stream Pollution Control Board, has entered a "finding of fact against Lever Brothers" and that Lever Brothers were exercising their rights under the statute and taking an appeal to be heard by the membership of the entire Board.' We have been unable to learn the results of this second hearing although we have made many requests for this information which we were promised at that time.

"Exhibits 6 through 13 pertain to pollution of Lake Michigan.

"Exhibit #6: A news article which appeared in the Chicago Daily News on July 30, 1948, written by Austin Boyle, in which he stated that Attorney General Barrett of Illinois, reported that Indiana authorities would be in compliance with an order of the United States Supreme Court, within a year, which would halt pollution of the southern end of Lake Michigan.

"The story also stated that three beaches, Calumet Park in Chicago, the City Beach in Whiting, Indiana, and the City Beach in Hammond, Indiana, were closed because of pollution in Lake Michigan.

"Exhibit #7: A letter to John T. Kelly from Mr. Albert H. Stevenson, Sanitary Engineer, United States Public Health Service, dated October 28, 1948. Excerpt: 'Swimming is not recommended in Lake Michigan at Calumet Park, etc.'

"Exhibit #8: A letter to John T. Kelly from Mr. D. W. Evans, Regional Engineer, United States Department of Health, Education, and Welfare, dated December 28, 1955. Excerpt: 'The Public Health Service will take such practical measures within its available resources to ascertain the source of the November 22 oil pollution and to prevent similar occurrences in the future.'

"Exhibit #9: A letter to Mr. Lewis L. Birdsall, Cook County Clean Streams Committee from Mr. L. A. Beaudin, Chief, United States Army Engineers in Chicago, dated August 30, 1961. Excerpt: 'Popcorn slag on the water, at Calumet Park is believed to come from the United States Steel plant in South Chicago.'

"Exhibit #10: News article taken from the Chicago Daily Calumet, dated July 2, 1963, titled SETTLE IN RIVER DUMPING, reporting the Federal law suit against three local steel mills in South Chicago was settled and that they paid $600,000.00 damages for pollution of the Calumet River which leads into Lake Michigan. These companies were: The Republic Steel Mill, the Wisconsin Steel Mill, the International

Harvester Company, the Interlake Iron Company.

"Exhibit #11: Editorial which appeared in the Chicago Daily Calumet, dated August 15, 1963. Titled OIL, GREASE PREVENT USE OF AREA BEACH. Article stated swimmers and waders could not use Calumet Park because of heavy oil or tar in the water.

"Exhibit #12: Editorial which appeared in the Chicago Daily Calumet, dated August 17, 1963 titled CLOSE CALUMET PARK BEACH. In this article editor pointed out water was too dirty to swim in. Demanded investigation by United States Public Health Service.

"Exhibit #13: Editorial from the Chicago Daily Calumet, titled WATER POLLUTION dated August 24, 1964. The writer states that 'The water in Lake Michigan at Calumet Park contains oil, grease, slag, and other debris. Dead fish line the shore each morning. The writer points out that there is a Federal injunction against dumping waste into the lake but it is not being enforced. A second news article on this exhibit, titled CANCEL BEACH CHECK, appeared in the Chicago Daily Calumet on August 27, 1963, in which the writer reports that under Public Law 660 the United States Public Health Service will not make an investigation unless requested to do so by the Governors of each state.

"As a sportsman I must point out that fish of desirable game species frequently will not live in water which the average American citizen drinks, because the chemical treatment often required to kill the bacteria is sufficiently toxic to kill any fish that might be put into it. Fishing at the south end of Lake Michigan has been poor for years.

"Mr. Chairman, our membership asks that you carefully review this and all other statements made at this hearing by persons who are not financially interested in the outcome of this hearing and let justice decide the verdict. The elimination of pollution is a social cost of doing business in this country and those industries, which through one method or another avoid this expenditure, certainly have a decided advantage over their competitors that do obey the law.

"Thank you for permitting me to present this statement for the record.

"Signed John T. Kelly, Newsletter Editor and Director."

MR. CHANTIGNEY: I believe this Hearing will be recorded in history as being responsible for a modern miracle, turning the dirty water of the present into clean water of the future.

I thank you for the opportunity granted to testify here today.

CHAIRMAN STEIN: All right, Colonel Chesrow.

MR. CHESROW: I would like to take this opportunity to thank Mr. Chantigney and his committee for the outstanding cooperation they have given to us, the Sanitary District in our accelerated clean streams program.

They are doing a wonderful job.

MR. CHANTIGNEY: Mr. Chesrow, I would like to compliment you and Mr. Bacon. In our last meeting, I asked that one portion of Calumet be cleaned. This was on a Tuesday evening and your people were over there Thursday morning and I don't know how fast is fast, but this is fast.

Thank you.

(Laughter)

MR. CHANTIGNEY: I will leave all this stuff.

CHAIRMAN STEIN: Thank you very much.

MR. KLASSEN: Thank you, Joe.

I don't know how many members there are in the Illinois Federation of Sportsmen's Clubs. The last count I had was some 16,000. The Executive Secretary of the Illinois Federation of Sportsmen's Clubs wants to put a statement into the record here. Mr. Ace Extrom.

MR. EXTROM: Mr. Chairman, conferees:

I am Ace Extrom, Executive Secretary of the Illinois Federation of Sportsmen's Clubs, which organization has as its objective the encouragement of intelligent management of the life sustaining forests and plant life and wildlife in order that these resources may be wisely used and preserved for future generations.

Hunting, fishing and outdoor recreation is a the average American citizen drinks, because the chemical treatment often required to kill the bacteria is sufficiently toxic to kill any fish that might be put into it. Fishing at the south end of Lake Michigan has been poor for years.

"Mr. Chairman, our membership asks that you carefully review this and all other statements made at this hearing by persons who are not financially interested in the outcome of this hearing and let justice decide the verdict. The elimination of pollution is a social cost of doing business in this country and those industries, which through one method or another avoid this expenditure, certainly have a decided advantage over their competitors that do obey the law.

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MR. CHANTIGNEY: I believe this Hearing will be recorded in history as being responsible for a modern miracle, turning the dirty water of the present into clean water of the future.

I thank you for the opportunity granted to testify here today.

CHAIRMAN STEIN: All right, Colonel Chesrow.

MR. CHESROW: I would like to take this opportunity to thank Mr. Chantigney and his committee for the outstanding cooperation they have given to us, the Sanitary District in our big business in which millions of people participate and on which billions of dollars are spent annually. Proportionately, the sportsmen of Illinois participate and spend in an effort to gain a beneficial effect of the great outdoors.

Although we realize that our expanding economy makes it possible for the sportsman to earn a living and the time to enjoy his avocation, it does not seem necessary to sacrifice our natural water resources on the altar of progress.

Streams and lakes are regarded as public property and they should be kept fit for human uses and enjoyment.

Yet, some waters are barely acceptable to the aesthetic senses and some may be labeled as disgusting spectacles.

Proper waste disposal by municipalities and industries has an economic value in supporting aquatic life and in making available land for forest preserves, picnic areas and other outdoor uses.

Heavily polluted streams not only are offensive to the senses, they also impose a hazard to the health of those coming in contact with these waters.

There are those who contend that the public must be satisfied with minimum acceptable water qualities in streams and lakes if our industrial and urban way of life is to progress.

They argue in substance that the surface waters cannot be maintained in a condition suitable for every conceivable use and, therefore, alternate recreational areas must be built.

Surely, there is a grain of truth in these assertations, but the family, the men, the women or the child who has to travel extreme distances to avoid a polluted stream and reach a suitable place of recreation will often seek some other less acceptable form of relaxation closer to home.

We are concerned with the long term degrading effect of many wastes on our waters, wastes solids blanket the bottom of the streams, chemicals of many varieties inhibit or snuff out the organisms upon which higher forms of aquatic plant life and animal life depend.

Even when chronic discharges of wastes to streams are eliminated, accidental losses of materials are frequent enough to label them careless losses. Waste discharges, even though accidental, have the same effect on the stream as purposeful discharges.

Recovery of streams from fish kills and desecration of aquatic life may require years of reestablishment and acceptable balance of aquatic environment. Many municipal officials who so honestly desire to develop their community often fall short in planning for waste treatment.

Too frequently they fail to provide competent waste works operation, fail to adequately compensate a good operator for his services, fail to give financial support to waste and disposal facilities.

Many industries which have contributed so much to our economy research, product and employment react slowly in meeting their water pollution abatement obligations to the general public.

Keeping pollution, natural wastes out of our waters may mean increased cost of product ultimately borne by the consumer. Only when industry as a group observes its margin of competition will the individual enterprise devote its energies to clean waters.

Mr. Chairman, the Illinois Federation of Sportsmen's Clubs is pleased to have the opportunity to express its views and anxieties.

The cooperation between our organization, the Illinois Sanitary Water Board, the Clean Streams Committees and other agencies has been most productive.

We sincerely hope that this conference will result in constructive actions aimed to restore and preserve our streams and lakes for the beneficial use of people and I thank you.

CHAIRMAN STEIN: Thank you, Mr. Extrom.

Are there any questions or comments?

(No response)

If not, we will stand recessed for ten minutes and I ask everyone, including the conferees, to come back promptly because if you do, we are going to make a valiant effort to recess again at 4:30.

We stand recessed for ten minutes.

(A ten minute recess was taken.)

CHAIRMAN STEIN: May we reconvene.

Mr. Klassen?

MR. KLASSEN: Sometimes the men think that they are responsible and run things, but I think most of the time we are just kidding ourselves because in Illinois, for example, our water pollution law -- the first one was introduced by a woman and she said there is no reason why a housewife shouldn't be interested in water pollution because, after all, it is merely a question of municipal or industrial housekeeping.

This is why we always welcome the participation of a ladies' organization in this fight for clean streams.

We are going to depart very slightly from the agenda today and have a very brief statement from the League of Women Voters of Illinois, by Mrs. Anderson, who is the State Water Resources Chairman.

Mrs. Anderson.

MRS. ANDERSON: Mr. Chairman, conferees, ladies and gentlemen:

We urge you not to consider --

CHAIRMAN STEIN: May we have your first name, please, Mrs. Anderson? I guess you are not the only Mrs. Anderson in Chicago.

MRS. ANDERSON: Mrs. Daniel C. Anderson

(Laughter)

Joan.

We urge you not to consider this brief statement a measure of the deep interest the League of Women Voters has maintained for many years in the conservation of our water resources.

Of our 76 local Leagues in Illinois, in urban, suburban and rural communities, about 45 are in the Chicago Metropolitan area.

Although the League of Women Voters of Illinois has a long-standing interest in water pollution control and abatement, we are attending this conference as most interested observers and will not be presenting a detailed statement.

We feel our best contribution to the success of this conference will be to create in our communities public understanding and awareness of the problems discussed here.

Thank you.

CHAIRMAN STEIN: Thank you, Mrs. Anderson. Mr. Klassen.

MR. KLASSEN: I might say off the record.

(Discussion off the record)

The National Izaak Walton League has their headquarters here in Chicago.

They have been long noted for their active interest in clean waters and a statement from the League will be presented by the Executive Director, Mr. Riaski.

MR. RIASKI: Mr. Chairman, conferees, ladies and gentlemen:

I am William A. Riaski, Executive Director of the Izaak Walton League of America, the National Headquarters of which is located in Glenview, Illinois. The League is a Nationwide organization of citizens dedicated to the wise and proper use of America's natural resources.

It may be of some interest to you to know that the League, at the behest of President Hoover, in 1927, conducted the first nationwide survey of water pollution in the United States. Mr. Hoover at the time was Secretary of Commerce and the Honorary President of the League. The League was then but five years old but throughout its life, it has had an active and intensive interest in water pollution abatement.

The increasing pollution of the waters of the Grand Calumet River, Little Calumet River, Calumet River, Wolf Lake and the southern end of Lake Michigan constitutes a very grave problem. There is little doubt that in some of the areas involved it is not only disagreeable to the eye and the nose but in many cases the condition of the waters actually presents health hazards.

The entire problem of water pollution in the area is greatly affected by the fact that much of the water involved is only slightly higher than the levels of water in Lake Michigan.

Several of the streams concerned have a very low rate of flow for this reason and, at times, appear to be almost stationary. The presence of many combined sewerage systems which carry both human and industrial wastes as well as that from storm sewers adds to the complexity of the problem.

In times of rapid runoff during and following heavy rainstorms, it is not unusual for such sewers to bypass into the streams because the sewage treatment plants simply cannot accommodate the huge flows of water involved.

Griffith, Hammond, Highland, Munster and Schererville (all in Indiana) have combined sewer systems and sewage treatment plants which empty into the Calumet River and some times produce such overflows into it that these go into Lake Michigan during periods of reversal of flow.

The same holds true for Burnham, Calumet City, Chicago (Calumet Treatment Plant), Dolton, Lansing, Phoenix, Posen, Riverdale, and South Holland (all in Illinois) which also have combined sewers which sometimes overflow into the Calumet River and into Lake Michigan.

East Chicago, Gary, Hammond and Whiting (all in Indiana) have combined sewer systems which sometime overflow into the Indiana Harbor Canal - Grand Calumet River system and thence into Lake Michigan.

Chesterton, East Gary, Griffith, Hobart, Porter and Valparaiso have combined sewer systems which sometimes overflow into the Little Calumet River - Burns Ditch system and into Lake Michigan.

Whiting, Indiana, also has a combined sewer overflow which discharges directly into Lake Michigan.

Pleasure boats and commercial vessels contribute to the pollution of Lake Michigan. In fact, these can be particularly dangerous sources of health hazardous pollution because of their unique ability to discharge such wastes in close proximity to the water intakes of the cities of Chicago, East Chicago,,Gary and Hammond.

The list of industries which are polluting the waters under consideration is resplendent with the names of some of America's most prosperous businesses. Of late, the executive officers of most of these businesses have been furnishing their stockholders and the public with glowing accounts of their prosperity during the past year. It is usually not the lack of sufficient capital which prevents them from installing adequate sewage treatment systems but rather their general disregard for the problems raised by water pollution.

The Inland Steel Company and the Youngstown Sheet and Tube Company of East Chicago; and the United States Steel Corporation of Gary are polluting the Indiana Harbor Canal - Grand Calumet River system and Lake Michigan as are the Cities Service Petroleum Company, Sinclair Refinery Company and Mobil Oil Company in East Chicago.

Wastes are being discharged directly into Lake Michigan by the American Oil Company and Union Carbide Chemicals Company, both of Whiting; the American Maize Products Company of Hammond and the United States Steel Corporation of Chicago. Other important industries in the area also contribute to the water pollution problem in various degrees.

Currents in Lake Michigan are of considerable importance for their presence at some periods and their absence at others, the direction of the currents and their speed all enter into the picture.

It is worthy to note to those present today who live in the areas under discussion that this conference is being held in the Banquet Room of this building.

One is tempted to speculate on the number of folks who have gathered here who have drunk water taken from Lake Michigan. In spite of the fact some health authorities claim no real danger exists after such water is properly treated with chlorine and other chemicals in a modern water supply system, one cannot help but wonder why it often has a rather disagreeable taste and perhaps is even a bit discolored. This also applies to the water in the pipes in their homes if the water comes from Lake Michigan.

There is little doubt the most important subject in connection with this conference is the health of the vast number of people who daily drink and wash in such waters, as those under consideration.

The Izaak Walton League of America feels it is extremely important that these waters be given far more protection for this purpose alone. However, there are many additional benefits to be gained from clear water for industrial, recreational and other uses.

It is definitely time all concerned exert a major effort to restore these waters to a high degree of purity for the benefits which it will return in the health, welfare and economic well-being of every one.

Colonel Mattina in answering a question yesterday following his presentation for the United States Corps of Engineers, made a statement of considerable importance, and the full significance of which may be overlooked.

There had been some discussion about the possible location of a proposed dam to be built on the Grand Calumet River designed to control its direction of flow. When questioned about his thoughts as to exactly where the dam should be built, Colonel Mattina responded to the effect that, in his opinion it was much more desirable to abate pollution rather than to flush the polluted waters one place or another.

The League believes the American people possess the ability, ingenuity, energy and wealth to abate pollution by all means possible. Certainly it is fully as important to devise new types of sewage treatment plants which have an efficiency rating approaching the 100 percent level as it is to land a man on the moon!!

Also, much more practical application should be made of knowledge presently available in order to achieve a higher degree of pollution abatement.

The Izaak Walton League of America is honored to be able to appear before you and it calls upon you to take immediate steps to rectify the various sources of water pollution mentioned above as well as a multitude of others much too lengthy to be included herein.

CHAIRMAN STEIN: Thank you, Mr. Riaski.

Are there any comments or questions?

(No response)

Mr. Klassen.

MR. KLASSEN: One of the affiliated groups of the Izaak Walton League is the Illinois Division of the League and its President, Art Fanning, wants to present a statement. I wouldn't say wants to, we invited him to, as to the position of the Illinois Division.

MR. FANNING: Mr. Chairman, conferees, ladies and gentlemen:

I am Art Fanning, President of the Illinois Division of the Izaak Walton League of America.

We, the members of the Illinois Division of the Izaak Walton League of America, state to the conference the policies of the Izaak Walton League of America and the result of over 43 years of thinking and work on the part of members, chapters, divisions and international organizations of the League.

The Izaak Walton League was founded right here in Chicago, Illinois, on January 14, 1922.

We welcome this conference on water pollution, called by Mr. Anthony J. Celebrezze, Secretary of Health, Education, and Welfare.

We know that the states involved, Illinois and Indiana, have been unable or unwilling to stop this pollution. We are interested in clean waters.

We have present at this conference, the Chairman of our Clean Waters Committee, Walt Sherry, also Joe Chantigney. These Chairmen, along with the Committee members, will be glad to inform the members of all the problems of pollution in the Grand Calumet and Little Calumet and their tributaries.

CHAIRMAN STEIN: Thank you.

Any comments or questions?

(No response)

Mr. Klassen?

MR. KLASSEN: One of the organizations that is vastly getting many new members and certainly equipment is the Outdoor Boating Club of America, which has its headquarters in Chicago, and a statement from that organization will be made by Mr. Ron Stone.

MR. STONE: Mr. Chairman, Fellow Conference Participants, Ladies and Gentlemen, my name is Ron Stone. I am the Director of the Government Relations Department of the Outboard Boating Club of America, headquartered in Chicago.

We are a National trade association representing 208 manufacturers in the recreational boating industry, 28 of them in the two states that are the participants in this conference.

Our Illinois and Indiana-based member manufacturers enjoy a multi-million dollar share of the boating market. Their products are top brands in outboard motors, outboard and inboard boats, sailboats, houseboats, boat trailers and marine accessories.

The Outboard Boating Club of America speaks for the people who buy pleasure boating equipment as well as the people who manufacture and sell it. Over 350 boating clubs, boasting 40,000 individual members are affiliated with us from coast to coast. Fifty-eight of our clubs are in Indiana and Illinois, and twelve in the immediate area under consideration.

Naturally we are more than interested in the subject of water pollution and abatement along the south shore of Lake Michigan. There is a tremendous investment in dollars and pleasure at stake here. The Chicago-Gary metropolitan area is the second largest market in the country for outboard motors. We estimate there are at least 214,000 outboard motors in use in this area alone.

When we speak of recreational boating, we are talking not only of cruising, but of fishing, swimming, water skiing, skin diving and other related recreations involving the use of boats. We are talking about the leisure activities of hundreds of thousands of persons on and about the waters at the southern end of Lake Michigan.

How do all these people find the waters at the south end of Lake Michigan? In many cases, not very good... and getting worse.

It does not take a scientist to ascertain that streams in the Calumet area are polluted with raw sewage... only a deep breath. Waters of the Grand Calumet River and Indiana Harbor area are so unfit for recreational boating that they are not used.

The Calumet River and parts of the Little

Calumet River are used for recreational boating, but are hardly ideal with floating debris, oil, and sewage conditions prevailing generally. But what else is there for boaters to use in the area except polluted waters?

That these waters are a health hazard, that fishing is bad to non-existent, that swimming and other boat-oriented recreation are less than pleasant in many areas is well known. The water may be "gritty", oily, or variously hued, depending upon the type of pollution where the boater is trying to enjoy himself along the south shore of Lake Michigan.

In recent years the growth of pleasure boating has been at a phenomenal rate. Pleasure boating is called "the Nation's fastest growing family sport". Marinas, mooring facilities, launching ramps and docking areas are unable to keep up with the booming popularity of pleasure boating and related sports.

The State of Illinois alone expects to spend over $5 million in the next ten years on boating facilities, much of it in the Lake-Cook County area. Many cities along the south shore of Lake Michigan are building and planning public marinas and launching facilities, not to mention private developments.

Clearly there will be many more people looking to the waters of the area for recreation in the future. Clearly too, the waters will not provide this recreation if current pollution practices are allowed to continue.

Ironically, we have heard it said that the tremendous interest in the use of inland waterways for boating, fishing, and other recreational pursuits is responsible for part of the water pollution problem. If recreational watercraft do contribute to pollution, we submit it is very negligible compared to municipalities who inadequately treat or fail to treat their sewage at all before discharging it into the water, and industries which likewise fail to properly treat their waste products before dumping them. Let's not overlook the detergent and pesticide problems either.

At the annual meeting of the National Association of State Boating Law Administrators, held November 18-20, 1963 in Oklahoma City, a Committee was appointed to report on the nature and extent of pollution of the waters of the United States by recreational watercraft and to make recommendations relative thereto.

The Pollution Study Committee with Mr. Keith Wilson, Director, Michigan State Waterways Commission, as Chairman completed its study and reported at the 1964 NASBLA meeting in November at Portland, Oregon. The Study Committee concluded that "Pollution of waters attributable to recreational watercraft is of a most insignificant nature." A copy of the Study Committee Report is attached to this statement.

More recently, the United States Public Health Service Report of February 1965, on pollution of Lake Michigan waters along the southern shore and in Calumet region streams indicates that pollution from pleasure craft is infinitesimal compared with pollution from industrial and municipal sewage sources and that contributed by 11,000 trips of large cargo vessels in these waters annually.

If pollution from recreational watercraft were completely controlled, we do not think it would make any significant difference in the pollution problem in general. Nevertheless, we are eager to do everything possible to eliminate recreational boating as a possible source of water pollution however insignificant.

Potentially problems of pollution from recreational watercraft are likely to be most acute within areas of large concentrations of boats, such as marina, where there is perhaps less dilution effect due to limited current flow and other factors.

Obviously, an important and effective deterrent to pollution in shoreside areas of heavy boat concentration is the provision for adequate sanitary and trash disposal facilities. Thus, marina operators, both public and private, should be encouraged to place rest rooms and trash disposals convenient to docks and launching area.

Another aspect of the situation is the deposit of rubbish and garbage overboard, particularly in areas where, when washed ashore, it will prove a nuisance to littoral and riparian property owners. This kind of heedless behavior is usually prohibited under general legislation found in most states.

As a practical matter, however, effective enforcement of such laws is difficult. But the problem is not insurmountable. On our public highways where littering was formerly a serious problem, it now seems substantially remedied by the twin approach of education and enforcement. Fines for an offender are often very high, and more important, the public has been persuaded to cooperate. We are encouraged by anti-litter campaigns for our waterways already initiated by boating groups alone and in cooperation with organizations such as Keep America Beautiful, Inc.

An example of such anti-litter campaigns is that of the Salt River Project, an irrigation and water supply district in Arizona whose reservoirs provide a great deal of outdoor recreation and boating for the public.

The Salt River Project furnishes plastic containers for use by boaters in stowing their trash. In a year and a half more than 150,000 of these bags have been distributed free of charge in gasoline stations, marine dealerships, and marinas.

On the front of the bag is printed, "Don't be a Litter Bug. Use this Litter-Lugger. Put your empty cans, bottles and trash in this bag while having fun at the Salt

River Project Lake - then lug your litter home!"

On the back side of the bag there is a condensed version of the Arizona Boating and Water Sports Laws, including a provision which prohibits dumping refuse or debris on the shoreline or waterways of the state. Cooperation by the public is reported to be excellent. We submit such campaigns can easily be conducted in other areas to prevent littering from recreational users.

If we may judge by recent state legislation, the greatest attention in the area of boat pollution today is being devoted to regulating the operation of toilet facilities aboard boats. There are basically two legislative approaches to this:

1. Require the sealing of all marine heads to prevent the discharge of any excrement or other human waste into the water on the theory that this will eliminate the possibility of any pollution.

2. Require all marine toilets to be equipped with some device which will either effectively treat waste material before discharge into the water or provide for its retention and subsequent disposal some place other than in the water.

The first method - sealing - is highy unrealistic since it defies basic laws of nature. This approach is also highly unfair since reasonable alternatives do exist. A sealed toilet may create problems of convenience and etiquett but is unlikely to prevent the deposit of waste materials when the occasion demands.

A number of devices are now on the market which treat human wastes before they are committed to the water. For the most part these are chlorinating units of one kind or another. Usually some maceration process is also involved prior to chemical treatment.

Also recently developed are special devices to hold waste materials until they can be disposed of in waters far offshore not susceptible to pollution or at a special shoreside facility.

The availability of these marine toilet appurtenances has given rise to a second form of state legislation, which we consider to be a more reasonable solution to the boat pollution problem.

In 1957 the state of New Hampshire, after considerable testing of the effectiveness of marine chlorinators, passed an act requiring that every toilet on any boat operated on state waters be equipped with a state-approved treatment device, and prohibiting the discharge of any untreated sewage into the water.

The Act authorizes the state's Water Pollution Commission to determine the adequacy of treatment devices, and any device used in a boat on New Hampshire waters must be constructed and installed in accordance with regulations of the Commission.

State registration of watercraft equipped with toilets is conditioned upon proof that the toilets are fitted with an approved treatment device. All boats having toilet facilities are subject to inspection at any time to see that they comply with the law, and those that do not will have the registration suspended if the equipment violation is not corrected as soon as practicable.

The New Hampshire Act was endorsed by the New England Water Pollution Control Commission not long after its adoption, and started a wave of action in the same direction.

Subsequently, the Council of State Governments issued, as part of its program of suggested state legislation, a model act very similar to the New Hampshire law. About the same time the Outboard Boating Club of America published its "Model Act on Sewage Disposal from Boats." (A copy is appended to this statement)

Both acts recommend the use of marine toilets be permitted only with affixation of a treatment facility or method authorized by regulation of the state pollution control agency. They also authorize the state boat registering agency to refuse to number boats with toilets unless they meet the requirements for treatment devices.

At the same time, it is suggested that this problem remain exclusively under state jurisdiction, and that local units of government be expresslydenied the right to regulate in this area. Over the past six years the Outboard Boating Club of America has distributed thousands of copies of its model act without charge to people in and out of government.

Recognizing the trend in boat pollution regulations, the Outboard Boating Club of America four years ago took positive steps to prepare boat manufacturers for the installation of required treatment devices.

We published a standard in our "Engineering Manual of Recommended Practices" for minimum space requirements for marine toilets fitted with chlorinator units. (See copy appended) Boatbuilders are advised to leave a recommended minimum space on craft of size and design reasonably expected to have toilets so that any owner hereafter required or wishing to install a sewage treatment device can do so without encountering structural difficulties.

At the time we first published our recommended standard on this subject, a joint letter was sent by the Outboard Boating Club of America and the National Association of Engine and Boat Manufacturers to all known boat-builders asking that they agree to leave the desired space. There was no dissent.

Consequently, we believe you will find that virtually all boat manufacturers now provide adequate space for sewage treatment devices.

Today there are an increasing number of

manufacturers interested in producing marine chlorinators. They, too, are conscious of the need for standards so that their products will be universally acceptable to the various state agencies responsible for approving treatment devices.

Recently these manufacturers have taken steps to meet and cooperate with recognized testing authorities to develop acceptable standards and criteria. The United States Public Health Service is also involved in this standard-setting process.

We would like to emphasize that boating law administrators, too, have jumped into the fight against water pollution. At the 1963 annual meeting of the National Association of State Boating Law Administrators, the administrators pledged their support to anti-pollution efforts by Federal and state government. They will seek to do all within their power to curtail any pollution by recreational watercraft, but at the same time, they intend to see that boaters are not made the scapegoats in particular pollution situations when the real culprits and real causes are elsewhere.

The National Association of State Boating Law Administrators has a Water Pollution Control Committee to implement its aims and to serve as a liaison with other agencies and groups likewise concerned with the abatement of pollution.

While the Committee does not feel that recreational watercraft contribute substantially to the over-all pollution problem, it is most anxious that a uniform system be made available to those states which now or in the future feel the necessity of such laws.

As a special member of the Committee, the Outboard Boating Club of America has prepared a model law dealing with the general subject of pollution from recreational watercraft. This model law has been extensively reviewed by the Committee and the United States Public Health Service, somewhat modified, approved, and now awaits the acceptance of the national body which will meet in November of this year. (a copy is appended hereto.)

In view of these effective and far-sighted efforts being made to stop pollution from recreational watercraft before it begins to become a problem, we are indeed interested to learn from the February 9th "Congressional Record" of the intent of Senator Gaylord Nelson of Wisconsin to draft Federal legislation to attack what he calls one phase of the pollution problem on the Great Lakes - the dumping or spillage of human, galley, and wash-water waste and garbage from vessels.

The proposed legislation would require all ships and pleasure craft which use the Great Lakes and other navigable waters to be equipped with Federally approved facilities for the proper treatment or retention of sewage and other wastes.

Although Senator Nelson is primarily concerned about pollution on the Great Lakes and its harbors in his home territory, when he talks about legislation affecting navigable waters in general, he infers such legislation would apply to navigable waters throughout the United States. Senator Nelson proposes to have the responsibility for the enforcement of anti-pollution laws on all navigable waters centralized and to streamline the enforcement procedure.

We do not believe that pollution from pleasure boats is the serious problem which Senator Nelson insinuates by joining pleasure craft with commercial ships and barges and government vessels on the Great Lakes.

The findings of the Pollution Committee of the National Association of State Boating Law Administrators confirm our belief. They found pollution from pleasure boats to be insignificant when compared with several thousand communities which still have inadequate municipal sewage treatment plants or no facilities at all, and with the thousands of industries still dumping untreated wastes into rivers and lakes.

Furthermore, we find it hard to believe that sewage and garbage disposal from pleasure boats on waters as vast and deep as the Great Lakes really poses a problem justifying pollution control regulation of pleasure boats on the Great Lakes.

If there is a problem involving pleasure boats, it is more likely on small congested lakes that are purely state waters, and the problem is of a local or state nature, not of Federal magnitude.

As the Wisconsin Committee on Water Pollution, the principal antipollution enforcement agency in Senator Nelson's own state, has stated:

> "Laws and regulations pertaining to sewage disposal facilities by commercial vessels operating interstate should be developed and enforced by the Federal Government. In the case of pleasure boats or boats operating within the waters of a single state, the enactment of laws and regulations should be a state responsibility as should the enforcement of such laws and regulations."

If Federal legislation affecting recreational boating in this area is to come nevertheless, we strongly urge that every effort be made to assure that it is as uniform as practicable with state pollution controls so that boatment traveling from one body of water to another within the boundaries of the same state or across state lines are not beset by dual standards.

In closing, let me emphasize once more that recreational boatmen are acutely aware of the necessity and desirability of keeping prime boating water like that of the south end of Lake Michigan and its tributaries pure and clean.

The future of boating in this area is dependent upon it. For this compelling reason, the boating sport and industry by and large have been, are, and will continue to be self-policing in the anti-pollution measures they follow. It is a minor contribution to the campaign against water pollution, we grant you, because pollution from recreational boats is a relatively minor problem.

Thank you, Mr. Chairman, for the opportunity of taking part in this conference to express our views.

CHAIRMAN STEIN: Thank you.

Are there any comments or questions?

(No response)

If not, then, Mr. Klassen.

MR. KLASSEN: The Chicago Academy of Sciences has a contribution to make, particularly in some of the scientific aspects of wildlife.

Dr. Beecher.

DR. W. J. BEECHER: Mr. Chairman, ladies and gentlemen: I am Dr. W. J. Beecher, Director of the Chicago Academy of Sciences.

I am also Chairman of the Conservation Council of Chicago and so, I am also a member of the Open Lands Project of the Welfare Council of Greater Chicago, and I speak for the Conservation aspects.

The Chicago Academy of Sciences was founded in

1857, it was known then as the first museum in the west.

One of the early directors, in 1860, was the first person to write scientifically about the occurrence of life in Lake Michigan. The paper he wrote for the Academy is scarce because the whole supply was burned up in the Chicago fire.

Well, the Academy has grown on from those days and has been interested in education of the public as regards biology and things of that nature and we very frequently have groups of school children and teachers out to study the life and stream life of local areas.

So, we are interested in pollution.

I am going to read the statement, that is the quickest way to get it out of the way, then I want to make one additional comment.

During the second week of November 1963, thousands of gulls, loons and fish-eating ducks were found dead and dying on beaches of Lake Michigan from Gary eastward and up the Michigan shore. The total estimate was in excess of 10,000 birds.

I alerted the United States Fish and Wildlife Service and the United States Public Health Service, Great Lakes-Illinois River Basins Project. Mr. Grover Cook, biologist of the project, sent some birds, I had picked up and refrigerated, on to Laurel, Maryland, for study.

There the toxicological examinations under Dr. Carlton Herman of Fish and Wildlife Service were delayed by immunization of the staff against Type E botulism before a study could be undertaken. However, eight months later, it was clear that botulism could not be accepted as the answer. Some of the dead birds showed no sign of it in their organs. Some 80 birds injected with the bacterium showed no signs of being affected at all.

Now, more than a year later, we still do not know what killed these birds. Insecticides, industrial pollution and poisons of unknown origin are suspect.

In the fall of 1964 some 5,000 further deaths were reported at the north end of Lake Michigan between St. Ignace and the Wisconsin border. Of these, 3500 were loons, bringing the total of loon deaths for 1963 and 1964 to about 6500. Since loons lay only two eggs a season, such a loss is difficult to make up; in fact, it is estimated that this wipes out most of the loon population lying north of the Great Lakes Region.

These deaths of very hardy species of birds, living mainly on fish, are alarming in themselves but are symptomatic of something seriously wrong in Lake Michigan. Loren P. Woods, Curator of Fishes, Chicago Natural History Museum, has reported the extensive biological changes that have taken place in Lake Michigan in the past 35 years.

The introduction of smelt and sea lamprey have wiped out the lake trout and most of the burbot, almost wiping out the fishing industry as well. The alewife has displaced the lake herring and the bloater has increased greatly in numbers. Thus, the so-called "rough-fish", ones having no market value, have displaced those which formerly supported the Lake Michigan fishing industry. Alewives are cast up in huge windrows every summer from Wilmette over to the Michigan side. The beach becomes impossible for swimming; the stench is that of a huge garbage heap.

But these are not the only changes. It has been reported by the United States Public Health Service that the equivalent of raw sewage of approximately 4,500,000 people is dumped into the Great Lakes. Increased nutrients in the lake over past decades have increased the abundance of algae, feeding on bacteria. The increase in green algae has been reported along beaches of the Indiana and Michigan shore, so that it is impossible to use the beach for recreation. Skin divers have encountered clouds of algae miles from shore.

The increased use of the lake by sea-going vessels and by pleasure boats may be an element in this pollution, but the industrial waste from steel mills and other industries in the Calumet area of northern Indiana has been well documented in the United States Public Health Service report of February 1965.

Much of the industrial waste lies on the bottom of Lake Michigan, essentially an insoluble, poisonous mass. It may be significant that the bird deaths occurred in the fall at a time when Lake Michigan begins its overturn - when cooling surface waters sink to mix with lower strata. Possibly the mingling of wastes from the lower strata into the biological food chain of microorganisms, at this time caused the deaths of fish and birds.

As of this date, we do not know what killed them but it is clear that Lake Michigan must be cleaned up. We have made a barbarous use of one of the world's outstanding natural resources, poisoned wildlife and threatened the lives of millions of people.

My additional statement is about the amount of pollution.

Actually, I agree very firmly with Mr. Meserow and seemed shocked that industry has never made any attempt to clean up by itself. Apparently, they have stringent laws to keep this pollution down. In fact, the one steel company down there in Indiana has dumped every day 990 pounds of ammonia nitrogen into Lake Michigan, 60 pounds of total nitrogen, 250 phenol, 60 pounds of cyanide, 7700 pounds of oil into the lake every day. It is rather frightening and shocking.

Certainly, one of the reasons why we have this large blob of poison out in the middle of the lake and the whirlpool first described by Dr. Edmund Andrews, once Director of the Academy, I think that this is the time to call a halt to this sort of thing.

I don't think we can be very soft about it, either. I think when the levels of pollution that are allowable are set, that they will have to be very stringently enforced and to stick with it. Because the thing that many people don't seem to realize today is that we live in a biological world. We are part of this world.

There are some things you can't do. People keep thinking science can bail us out.

We do this wrong and that wrong and science will save us.

This is something that science can't do. When you start fooling around with the drinking water, you are taking some awful risks.

So, I think that will be it.

CHAIRMAN STEIN: Thank you Doctor. Just one moment, there may be a question.

MR. POSTON: I would like to ask Dr. Beecher what causes the alewives to die each year?

I have noticed, being a smelt fisherman, that we seem to get more and more alewives each year and we get large numbers and they die. I am unable --

DR. BEECHER: I am an ornithologist. I say, when we come to a question like this, I have asked the same question of

Loren Woods.

He doesn't seem to know either. This is one of the mysteries.

I would say this, that, certainly, the Great Lakes study of the waters of Lake Michigan should be studied by a complete study. I think money should be provided on a grant basis for universities who wish to make studies like that out of the United States Public Health Service funds, perhaps.

MR. POSTON: You also talked about insoluble poisons in the bottom of the lake. Would you care to expand?

DR. BEECHER: This is actually drawn from Grover Cook's findings and I would prefer that you discuss this with him.

MR. POSTON: Thank you.

CHAIRMAN STEIN: Mr. Klassen?

MR. KLASSEN: The Illinois Federation of Women's Clubs merely wanted to indicate their interest in the subject.

Is Mrs. Roman Ford here? Would she stand up just to be recognized?

Apparently, she is not here.

The Edgewater Community Council, which is the north part of the City of Chicago, desires to place in the record a statement which will be given by Mr. Kilcullen, their Conservation Officer.

MR. KILCULLEN: Conferees from Illinois, Indiana and the United States Government, ladies and gentlemen: My name is

John Kilcullen, Conservation Officer for the Edgewater Community Council. Our boundaries in the City of Chicago are on the south side, Foster Avenue, on the west side, Ravenswood Avenue, on the north side, Devon Avenue and on the east side the Lakefront.

At the direction of the Executive Board of the Edgewater Community Council, I was appointed to come to this meeting and observe, as well as state the position of the Edgewater Community with regards to the pollution at the lower end of Lake Michigan. This community is concerned, as all people are, in a quality of water good enough to drink and swim in.

The Council is aware of the problem of metropolitan planning because it is proposed in the Comprehensive Policies of the Chicago Plan, to extend the landfill in the lake north from Hollywood to the city limits.

Our first question, therefore, is: "If this pollution is not corrected at the southern end of Lake Michigan now, what will the quality of the water be at the beaches in five or ten years?" The next question we have to ask: "What authority will establish water quality standards?"

Using Chapter VIII: "Effects of Wastes in Water Quality and Water Uses" - Water Quality Criteria is described in the report on pollution of the water of the Grand Calumet River, Little Calumet River, Calumet River, Lake

Michigan, Wolf Lake and their tributaries - Illinois and Indiana. We think the recommended criteria in the above report to be a good set of standards and, therefore, recommend to the conference that such water quality criteria be accepted as standards for the water quality at the lower end of Lake Michigan.

The basic economics of the possible future pollution of the lakefront as far north as Edgewater would certainly affect the property values of the area. If this pollution continues, the City of Chicago would certainly lower tax revenue in the area of Edgewater.

To be realistic, we in the Edgewater Community Council are, therefore, committed to the idea that this conference will hopefully come forth with a solution to this pollution before it becomes more troublesome than it is at present.

We wish to thank the United States Department of Health, Education, and Welfare, Division of Water Supply and Pollution Control, Region V, Chicago, Illinois, for the advice given to our Conservation Committee in giving us the data to read. It is refreshing to see again the cooperation from governmental bodies with civic organizations in the attempt to make this world of ours a better place to live and work.

Respectfully submitted.

CHAIRMAN STEIN: Are there any comments or questions?

For those of you who are still here, I would like you to turn your attention to the last two speakers. I think it may be wise to take a minute and give you at least what I believe might conceivably be a limitation of what we can do as a result of a conference of this type in enforcement procedures.

Now, whatever you may think about the dismal effect of killing loons or protecting the loons under our law, we are still bound by a nasty little item that we have to show a causal connection between a discharge of wastes and damage.

It very well may be that the proposals we heard from Mr. Gerstein this morning will protect the water supply. It very well may be that we may come up with something which will protect the beaches, or maybe these proposals of Mr. Gerstein will be broad enough to do that.

Unless we can ascertain with reasonable certainty, or have a fairly good notion of what causes alewives to die, or loons to die, or geese or ducks to die, we are going to have a pretty hard time controlling that.

The alternative to that is to prevent discharges of any wastes, and as good as we think we are, I am not sure we can quite do that. I do think that we have to recognize when, and only when, we can find the causal connection between the discharge of a pollutant and an effect, do we have anything with which to get at it.

Sometimes getting at these causal connections is very, very difficult.

Mr. Beecher pointed out that he suspected certain types of materials or parts of materials being responsible for these deaths. But I think that we should not delude ourselves that until we are pretty sure that we ascertain the cause of the destruction.

Mr. Klassen.

MR. KLASSEN: We have one more presentation for the State of Illinois.

We have a Governor in the State of Illinois who has a real interest in water, water pollution.

When he took office some four -- about four years ago -- while the many state agencies that were involved in water questioned an informal working arrangement, it was through Governor Kerner's efforts that a bill was passed creating a Technical Advisory Committee on Water Resources.

This legalized the working relationship that formerly existed and still does between all of the state agencies involved in the questions of water.

The administrative home of this agency is in the Board of Economic Development, but membership consists of the various state agencies that have this interest in water.

A statement has been prepared by this Technical Advisory Committee on Water Resources and it will be presented by Dr. T. E. Larson.

DR. LARSON: Mr. Chairman, conferees:

My name is T. E. Larson, Assistant Chief of the Illinois State Water Survey.

I am reading this for Mr. Ackermann, who is a member of the Illinois Technical Advisory Committee on Water Resources.

I am pleased to be here today as the designated representative of the Illinois Technical Advisory Committee on Water Resources. This Committee is a body created by State statute in 1963 to coordinate the several and interrelated water resources responsibilities of state agencies. The Committee is composed of the following individuals who direct the principal water resources agencies of state government:

Executive Director, Board of Economic Development, Chairman of Committee.

Chief, State Water Survey Division, Department of Registration and Education.

Superintendent, Division of Soil and Water Conservation, Department of Agriculture.

Director, Department of Conservation.

Chief, Division of Sanitary Engineering, Department of Public Health.

Chief, State Geological Survey Division, Department of Registration and Education.

Chief Waterway Engineer, Division of Waterways, Department of Public Works and Buildings.

The Committee performs four major tasks to supplement the functions assigned to the respective agencies.

First, the Committee is charged with advising the Governor on technical issues affecting maximum beneficial use of Illinois' water resources.

Second, the Committee determines ways to coordinate water uses and agency activities in the state to achieve maximum beneficial use.

Third, the Governor receives advice on proposed legislation from the Technical Advisory Committee. Besides reviewing proposals, the Committee may recommend legislation to further conservation and development of the State's water resources. The Committee gives particular attention to the problems of multiple use and reuse of water, and to the resolution of conflicts.

Finally, the Committee is assisting the Board of Economic Development, the State's planning agency, in the formulation of a statewide water development plan. The necessary studies are under way now. Each agency is responsible for certain appropriate phases of the work, and the Committee will recommend policies and programs for assuring the State's water uses of adequate future supplies.

The interests of this Illinois Committee extends to programs aimed at developing and exploiting one of mankind's greatest assets - the waters of our Great Lakes.

The lakes provide us, not only with a source of water for human and industrial use, but also with a highway of commerce, a source of fisheries and magnificent area of recreation. However, there are problems -- including the control of pollution through human, industrial and shipping wastes.

We must seek to manage these pollution sources in such a way as not to destroy any of the major actual and potential values of the lakes.

Difficulties are ever present and finding solutions to the complex matters that limit our realization of full opportunity from the Great Lakes is our primary task.

Present problems can be resolved by the preparation of short and long-range management plans for future protection and development of the Great Lakes. These plans, however, are going to take an even greater effort than we have been making in the past, a high order of cooperation and all of the collective information and intelligence we can bring to bear on the subject.

Water Supply

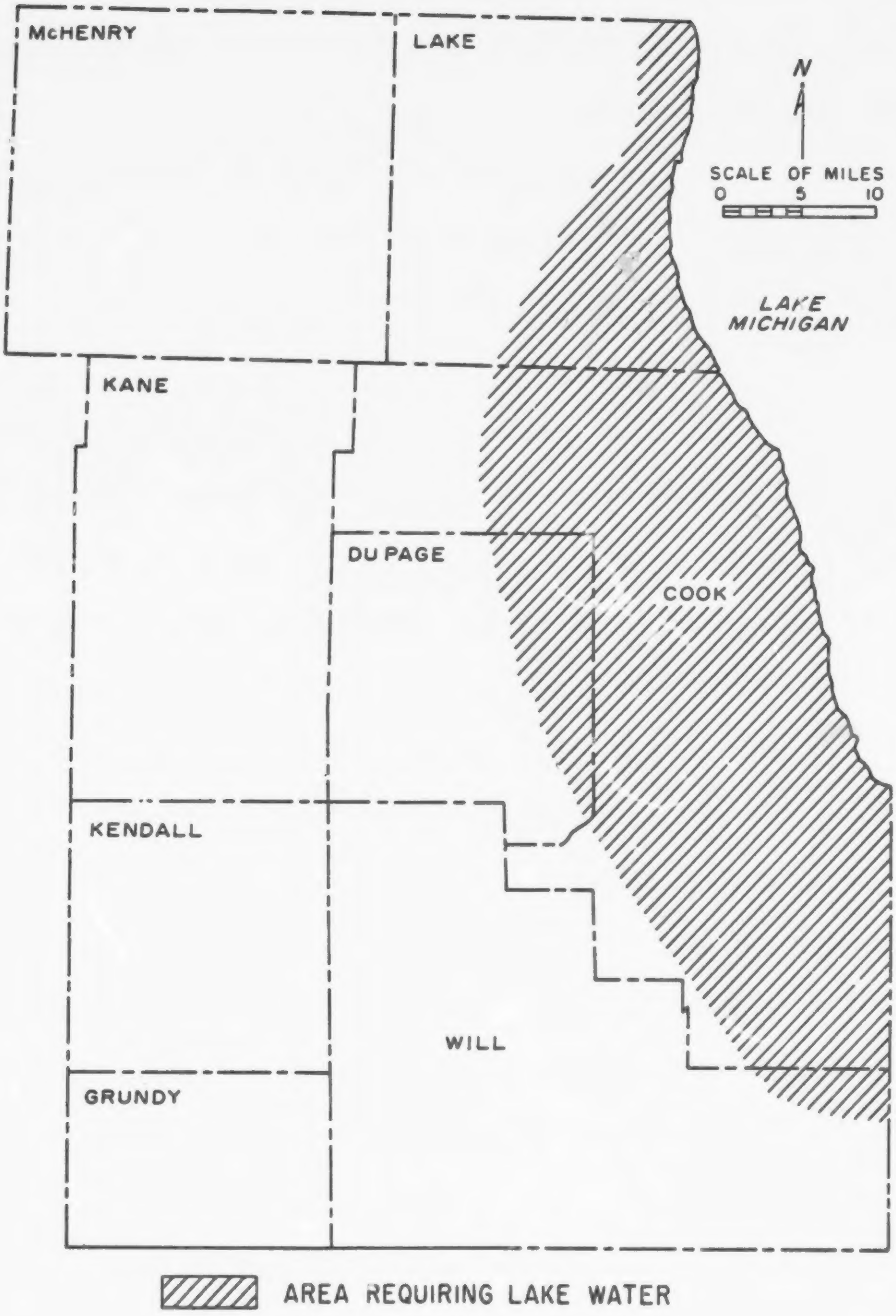
Of primary importance to the State of Illinois is the availability of Lake Michigan as a source of water supply. By the year 2000 it is predicted that some ten million people will be in the Chicago metropolitan area. Studies conducted by the Illinois State Water Survey show conclusively that the State's interior water resources, even when fully utilized, will be inadequate, and increasing dependence must be made on Lake Michigan waters for water supply.

The accompanying map shows by shading the estimated geographical area which will need to be supplied from the lake in the year 2000. (See Map - next page)

Recreation

Outdoor recreation is a major leisure time activity and generates an estimated $20 billion a year national market for goods and services. Water is a focal point of outdoor recreation -- "people want water to swim and fish in, to run their boats across, to dive under and to ski over." In addition to all the water activities which actually use water, many other activities are directly enhanced by the presence of bodies of water. Such activities include picnicking, walking and driving for pleasure, as well as all forms of waterfowl hunting. Thus, the presence of appropriate water bodies exerts almost as much influence as access in determining the adequacy of recreation resources of metropolitan residents.

The Outdoor Recreation Resources Review Committee (ORRRC) has speculated that increasing income, leisure time, mobility and population will result in more participation in outdoor recreation in the future. This participation is ex-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pected to increase threefold during the 40-year period from 1960 to 2000, and most of this increase will be concentrated in and near metropolitan areas such as northeastern Illinois. This means that either more intense use will need to be made of present water recreation facilities or more facilities will need to be made available. An effect of this projected increase in participation has been an increase in the relative importance of recreation in water resources development projects.

Since recreational use is a flow or on-site use of water, it can be measured in terms of available facilities. Current Water-oriented recreational use in northeastern Illinois amounts to 651 swimming pools, 187 miles of publicly-owned streams, 25,873 surface areas of inland lakes and the recreational opportunities afforded by Lake Michigan. When compared with other metropolitan areas, Northeastern Illinois ranks low in existing public facilities for outdoor recreation, but high in the degree of intensity of use of these facilities.

Pollution has been recognized as one of the major limitations of water recreation activities in metropolitan areas. The pollution results from the discharge of industrial and municipal wastes, storm water overflows, seepage from septic systems, discharge from pleasure boats, and runoff from lawns and agricultural areas that leaches chemicals and fertilizers.

The public becomes aware of water pollution only when it is in a noticeable form -- usually visible suspended matter, floating debris, green scum (algae growth), or an unpleasant odor. In such cases, the public shuns the recreational area, and its value is diminished. A much greater concern, however, is the unseen pollution which may be hazardous to health.

The State of Illinois, Department of Conservation advises that it is developing more detailed and specific data on recreation which is relevant to this conference and wishes an opportunity to submit this at an early date.

Health and Economy

In Illinois statewide planning for the development and use of its water resources, quality is recognized as being as important as quantity. Quality is important to the industrial as well as domestic user. When water of inferior quality is provided to industries by self development or by public water utilities, supplementary treatment to correct inferior quality is an economic loss to the industry, and if industry should choose a more favorable site on this basis, it then becomes an economic loss to the community and to the state. Similarly, if recreational facilities are degraded, the degraded environment for adequate living conditions results in a loss to the industry as well as to the community and the State.

Lake Michigan has represented a bountiful water resource for many purposes. Its quality is of great importance to the communities on and beyond its border. Creeping destruction of this natural excellent quality is of great concern to the State of Illinois from an economic standpoint as well as from the standpoint of the health and well being of its citizens.

The health and well being of the citizens of Illinois now depending on this principal adequate source of supply is paramount and to a great degree so is the economy of this important commercial and industrial center of the State and the Nation.

One parameter that may seem to be innocuous is the chloride ion, normally from salt. This ingredient, chloride, is present in human waste discharges and therefore, in waste treatment effluents. When present in increasing concentrations with time, it can, therefore, be an indication of the increase of other components from such discharges, many of which are unidentified. Increasing concentrations also promote increasing corrosion of metals in contact with the water. An increase in sulfate likewise can indicate the presence of an industrial waste discharge with other accompanying unidentified components.

This is taking place at an accelerated rate in the southern end of Lake Michigan. The accompanying figure shows the available records on these increases over the past hundred years. The data were obtained on request from the Bureau of Water of the Chicago Department of Water and Sewers.

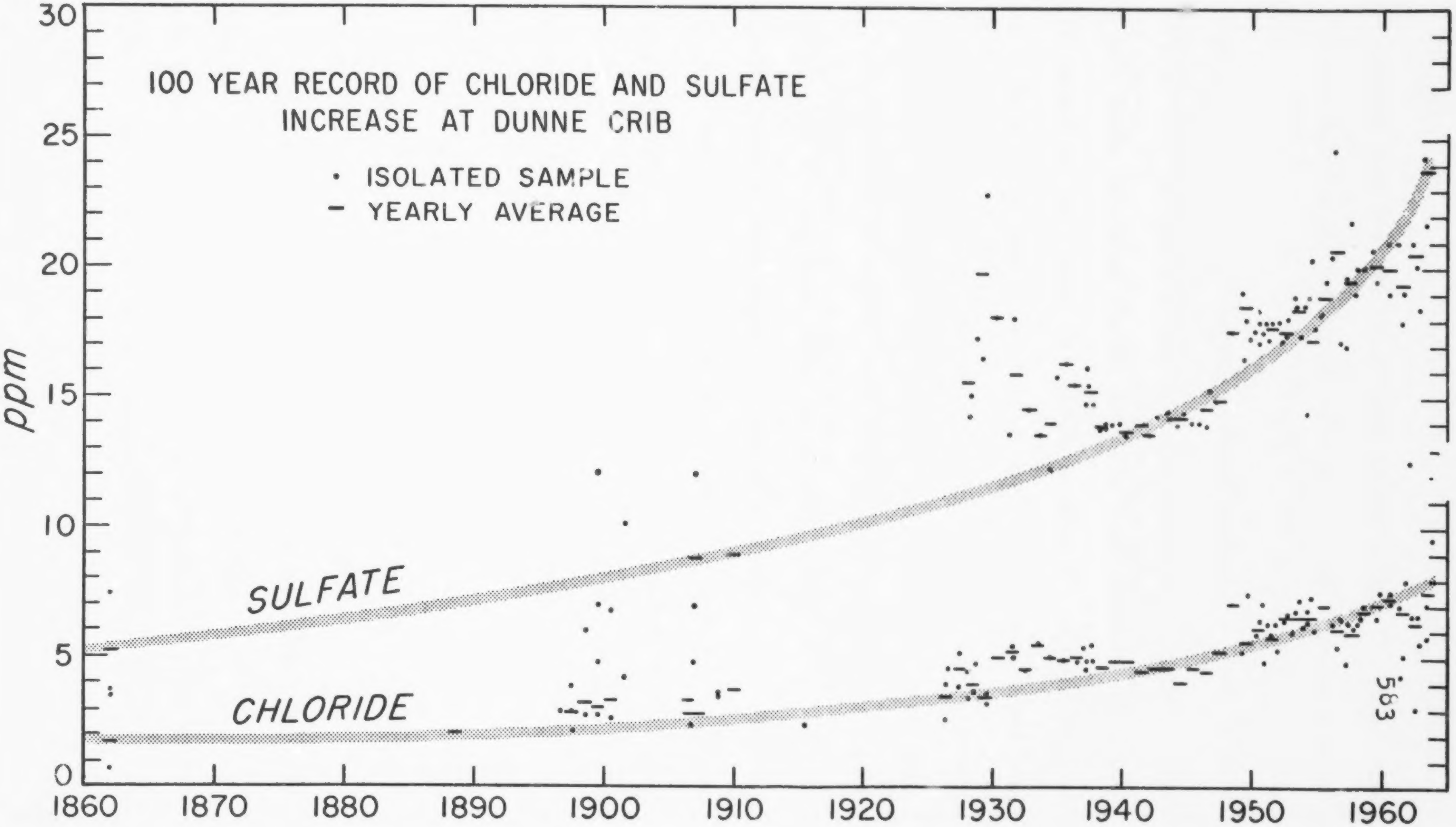
Of particular interest are three features of this chart. First is the general increase over this period, which is presently at a significantly greater rate. Second is the variability of the data which is particularly significant during the most recent fifteen year period. This variability is considered to be due to the directional changes in flow of water at the southern end of the lake and a center of increasing exceptional pollution.

Therefore, the general increase and the greater variability of the data during the past fifteen years is attributed to increasing waste discharges from the south of the sampling point at Dunne Crib.

The third feature of the data is the inconsistent ratio of sulfate to chloride. This inconsistency, which ranges from 2.2 to 4.3, range of variability indicates more than one type of waste discharge.

To a lesser degree there was some variability of quality in 1862, but most of these samples were collected closer to the mouth of the Chicago River and before the flow was reversed.

Another feature is the relatively constant and low rate of increase during the period between 1938 and 1948.

100 YEAR RECORD OF CHLORIDE AND SULFATE
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SULFATE
CHLORIDE
583

Obviously, a considerable degree of control was exercised at this time or some changes in industrial development were taking place.

If the lower average chloride values over the early period are extrapolated, the natural rate of increase of chloride without excessive pollution would be about 2.5 mg/l in 100 years. In 1963 a value indicating three times this rate has been recorded. During the past fifteen years the rate of increase has been approximately 1.8 mg/l per 15 years, or, by comparison an unnatural 12 mg/l per 100 years (almost five times the normal rate).

The data on sulfate increase is even more notable. The early data are not sufficiently defined to suggest a normal rate of increase, but since 1948, the general rate of increase is about 3.5 mg/l per 10 years with a sudden rise just prior to 1948 and again in 1963.

Now, I want to add something not in the text here.

The actual levels of concentration on the chart are tight. They are not too serious in themselves.

They do represent an appreciable amount of dilution from the concentration of the center of pollution.

The thing that is of real interest and concern is the accelerated rate of increase in the most recent years and I would like, at this time, to recommend to Mr. Poston that he include individual mineral constituents in one of the parameters for monitoring the water quality.

The Illinois River basin also is affected by waste discharges in the Calumet River as it enters the state and as it flows by way of the Calumet Sag Channel to the Sanitary and Ship Canal to the Des Plaines River and the Illinois River.

However, it is assumed that this is not a matter of direct concern in the present conference.

Conclusions

In the concern of the Illinois Technical Advisory Committee on Water Resources, "unnecessary pollution can be associated with toxic or otherwise harmful discharges to lakes and streams, and the Committee, therefore, urges its elimination.

We do not consider any water problems -- whether they be local, state, interstate, or international -- as unsolvable, although we must be continually searching for new solutions, which, above all, require coordinated efforts.

We consider Lake Michigan and its related waters a joint asset of great present and future value. It is our firm intention to contribute in every way possible to the present conference and any subsequent activities by making information available, by contributing to its analysis, by reasoning together, and by evaluating our alternatives to the end that this resource of great value will be protected and enhanced.

CHAIRMAN STEIN: Are there any comments or questions?

MR. CHESROW: Mr. Stein.

CHAIRMAN STEIN: Yes?

MR. CHESROW: First, let me compliment Mr. Ackermann and the --

CHAIRMAN STEIN: This isn't Mr. Ackermann.

MR. CHESROW: Mr. Ackermann wrote it.

Compliment him on that last paragraph and his conclusions.

They are very well put and most desirable.

By the same token, I haven't been able to follow his talk because I have a copy of a previous statement and I understand this is a condensed version.

MR. LARSON: That is correct. This is the official one.

MR. CHESROW: Until I have had an opportunity to go over this condensed version with our attorneys and, incidentally, as you know, did you know our lake diversion case -- I would like to reserve the right to make any comments on the condensed version.

CHAIRMAN STEIN: Will you be here for the rest of the conference?

DR. LARSON: Yes.

CHAIRMAN STEIN: If you have any questions tomorrow or thereafter, we may be able to resolve them.

MR. CHESROW: Thank you.

CHAIRMAN STEIN: Thank you.

MR. KLASSEN: Mr. Stein, I have a statement from the Hyde Park-Kenwood Community Conference that I would like in the record.

CHAIRMAN STEIN: It may go in.

STATEMENT FROM THE HYDE PARK-KENWOOD COMMUNITY CONFERENCE

The Hyde Park-Kenwood Community Conference is a neighborhood organization serving Hyde Park-Kenwood areas in the southeastern portion of Chicago. The region fronts on Lake Michigan from 47th to 69th Streets. The Conference serves as the center for local planning actions and as the spokesman for the community before government agencies.

The residents of the Hyde Park and Kenwood communities use Lake Michigan not only for their drinking water but also as their recreation area. A row of parks fronting on the lake provide the residents with much of their leisure time facilities.

We are deeply concerned with mounting pollution in Lake Michigan. We have examined the United States Public Health Service report on Lake Michigan and we are appalled to learn that tons of sulfuric acid, cyanide, and oil waste are poured into the lake daily by steel mills in the South Chicago-Gary region. Most of this waste is poured into Indiana waters, but the lake recognizes no boundary lines; the waste pours into our beaches and into our drinking water.

Only Federal action can stop the gradual ruin of Lake Michigan. We urge full use of the Water Pollution Act and recommendations by the Department of Health, Education, and Welfare, and of more stringent statutory controls of industrial waste.

Respectfully,
George Overton, Chairman
Parks and Recreation Committee
Hyde Park-Kenwood Community Conference"

MR. KLASSEN: Also, now, there is a statement of Mr. Raymond E. Anderson, General Manager, North Shore Sanitary District, Waukegan (Lake County) Illinois.

MR. ANDERSON: Mr. Chairman:

The development of the area along the North Shore of Lake Michigan proceeded slowly until about the turn of the Century, by which time the problem of water supply and pollution control arose. The larger towns in Lake County, Illinois, which draw their water supplies from Lake Michigan, found that untreated sewage from these same towns was polluting their source of drinking water.

Although some protective measures were taken early in 1900, the problem became increasingly more serious for all the shore towns of Lake Michigan. In April 1908, the

Lake Michigan Water Commission was organized to study pollution of the lake and its effect upon water supplies.

A second group, organized under the auspices of the Chicago Association of Commerce and known as the Lake Michigan Sanitary Association, urged in December 1908, that a sanitary survey be made along the north shore as far north as Waukegan.

As a result, early in 1909, a rather informal organization to study the problem locally was formed. It was known as the North Shore Sanitary Association, with its stated purpose "to investigate sanitary problems along the North Shore, and endeavor to work out a solution of the same."

On June 5, 1911, approval was given by the Illinois Legislature to "An Act to create sanitary districts and to provide for sewage," which Act applied specifically to the area along the North Shore.

In 1914, a part of this area was organized under this Act as the North Shore Sanitary District. Its boundaries have since been extended to include the entire shoreline of Lake County, Illinois. The Act states that "The Board of Trustees of any sanitary district organized under this Act shall have power to provide for the disposal of the sewage thereof and to save and preserve the water supplied to the inhabitants of such district from contamination...."

Between 1922 and 1928, sewage treatment

facilities were constructed to serve the sewered areas in Zion, North Chicago, Lake Bluff, Lake Forest, Highwood, and portions of Waukegan and Highland Park. This construction was financed out of the general tax levy. In the 1930's a bond issue, coupled with a PWA grant, provided for the construction of a new plant and interceptor for Waukegan; new treatment works in Winthrop Harbor and at Cary Avenue and Racine Drive in Highland Park; and major additions to the plants in North Chicago, Lake Forest, and Highwood.

Following a program of education and wise publicity, the voters, by a margin of more than two to one, approved a bond issue in 1953 for a comprehensive construction program.

This included major additions to the existing treatment works at Waukegan and North Chicago; a new treatment plant in Highland Park and an intercepting sewer from Waukegan to Highland Park to serve the Skokie Valley; an intercepting sewer from Winthrop Harbor to Waukegan, with pumping stations at Winthrop Harbor and Zion; extended outfalls into Lake Michigan at five lakefront plants; and other plant improvements. This program was completed in 1961, at a cost of over eight million dollars.

Sewage treatment plants with effluents discharging to Lake Michigan are operating by the North Shore Sanitary District at the following locations:

A. Waukegan -- activated sludge type, with year-around chlorination.

B. North Chicago -- highprate trickling filter type, with year-around chlorination.

C. Lake Bluff, Lake Forest and Park Avenue, Ravine Drive, and Cary Avenue, Highland Park -- Imhoff tanks, with four months of summer chlorination. Outfalls, with diffusers, ranging from 800 to 1,800 feet into Lake Michigan.

A summary of averages of pertinent effluent data for the period 1961 through 1964 follows:

Effluent Quality and Characteristics

Location	Flow, M.G.D.	5-Day B.O.D.,lbs.	1964 Coliforms per 100 ML Geometric Mean
Waukegan	9.79	1,679	221
North Chicago	3.39	1,405	29
Lake Bluff	.327	240	80
Lake Forest	1,429	762	66
Park Avenue,Highland Park	.843	613	191
Ravine Drive,Highland Park	.424	263	48
Cary Avenue,Highland Park	.889	459	82

The east fork of the north branch of the Chicago River has its headwaters west of Waukegan, within the boundaries of the North Shore Sanitary District. Its eighteen-mile length is paralleled by a Sanitary District intercepting sewer terminating at an activated sludge plant on Clavey Road in Highland Park. This plant serves the cities of Park City and Highwood and the western portions of Waukegan, North Chicago, Lake Bluff, Lake Forest, and Highland Park, with the effluent being discharged to the River.

The flow to the Clavey Road plant is primarily of domestic origin, although industrial areas west of Waukegan are rapidly being developed. With the exception of a small flow from the Goodyear Tire and Rubber Company plant in Lake Bluff which receives secondary treatment, no industrial wastes are discharged to the River, but are treated at the Clavey Road plant of the District.

The 1961-1964 average flow to the Clavey Road plant was 2.40 M.G.D., with a final effluent containing 315 pounds of five-day B.O.D. No deterioration of the River in Cook County, south of the plant, has been noted, as evidenced by the sampling program begun before the plant was built and continued regularly since it was put into operation.

Two Federal installations located on Lake Michigan, in Lake County, Illinois, who do not come under the jurisdiction of the North Shore Sanitary District, are the Great Lakes Naval Training Center and the U.S. Army, Fort Sheridan. Both have sewage treatment plants, with effluent discharge to the lake.

The Naval Training Center also has a sewage treatment plant located on the east fork of the north branch of the Chicago River which serves a portion of its facilities. The Illinois National Guard operates a small sewage treatment plant at its rifle range north of Zion, with intermittent effluent discharges to Lake Michigan during the summer months.

During the last decade, the muncipalities and industries within the District have also spent millions of dollars to control and prevent water pollution. Many miles of new sewer have been laid to collect sewage formerly treated inadequately by individual septic tanks, and to provide for new residential and industrial development.

Untreated or partially treated sewage discharged to creeks, to ravines, and to the east fork of the north branch of the Chicago River, has been intercepted and conveyed to sanitary district treatment facilities.

All of the industries have complied with the District's requirements for treatment of wastes before discharge to the receiving waters or for pre-treatment before discharge to the sewage disposal facilities of the District by installing a variety of controls, pre-treatment facilities, complete treatment works, or by revising manufacturing processes.

Industrial effluents, other than cooling water, are discharged to Lake Michigan from the following:

1. Johns-Manville Corporation. A lagoon effluent of approximately 12 M.G.D., with negligible five-day B.O.D. and suspended solids. 1964 coliform geometric mean

120 per 100 ML.

2. Outboard Marine Corporation. Small amounts of oil separator effluent. No other contaminants.

3. U. S. Steel Waukegan Works. An estimated 10 M.G.D., approximately two-thirds of which is neutralized and treated pickle liquors, the balance from rinses, galvanizing, general mill operations, etc. No organic or coliform contaminants.

4. Abbott Laboratories. Activated sludge type, with year-round chlorination. Coliform geometric mean of 47 per 100 ML.

5. Fansteel Metallurgical Corporation, 0.35 M.G.D. of neutralized acid. A small amount of suspended solids from the unused lime. No other contaminants.

The District's "Ordinance Relating to Sewers and Sewer Systems" sets forth conditions under which sewers may be constructed and used within the District. This Ordinance is particularly valuable in protecting both the District and the municipalities within it from unsatisfactory sewer construction and from various abuses of the sewers and interceptors already involved, have cooperated excellently to make the Ordinance effective.

As a means of continuously determining the effectiveness of its own treatment processes, and of performing special industrial, Lake Michigan or stream sampling and testing, the District has established a laboratory to perform extensive physical, chemical and bacteriological analyses. This laboratory has been issued a Certificate of Approval from the Illinois Department of Public Health under the Bureau of Sanitary Bacteriology and Laboratory Approval Program.

In 1964 the District completed its seventeenth consecutive summer season of routine sampling and bacterial analyses of Lake Michigan waters along the North Shore between the Wisconsin State Line and Cook County. This comprehensive program includes determinations of the water quality at the public beaches in Lake Michigan, and of the discharges from the District's disposal plants, and from industries.

Since 1947 when the special sampling program at bathing beaches within the District was initiated by the Board of Trustees at the request of the Illinois State Department of Health, thousands of samples have been analyzed and a great deal of information has been accumulated concerning the quality of waters of Lake Michigan along the North Shore. It is known that this quality varies with the weather, ravine flow, conditions of the lake, and the characteristics of discharges into it.

Following is a summary of water quality data, showing the geometric mean for coliforms and streptococcus, based on results obtained using the membrane filter technique.

Beach	1962			1963			1964		
	Number of Samples	Per 100 ML		Number of Samples	Per 100 ML		Number of Samples	Per 100 ML	
		Coli.	Strep.		Coli.	Strep.		Coli.	Strep.
Winthrop Harbor	55	629	11	57	155	5	63	139	13
Zion 25th Street	55	370	9	57	148	5	62	155	14
Illinois Beach State Park	55	294	9	57	111	5	63	107	10
Lake Shore along Pershing Road	56	395	6	53	243	4	63	88	9
Waukegan	55	266	3	57	87	3	63	54	5
Foss Park	52	820	13	57	278	7	63	192	20
U. S. N.							20	76	9
Lake Bluff	53	537	12	63	181	4	63	201	13
Lake Forest	53	390	7	57	192	5	61	182	15
Highwood	27	290	5	16	152	5	32	242	17
Park Avenue	56	283	6	57	132	4	62	183	14
Ravine Drive	54	328	9	57	137	4	63	254	18
Rosewood	41	299	9	57	214	7	63	302	22

All data is reported periodically to the Illinois Sanitary Water Board, which agency regulates water pollution control in Illinois outside the limits of the Metropolitan Sanitary District of greater Chicago.

We believe the Illinois Sanitary Water Board has done an outstanding job of controlling water pollution. The record shows that the responsibility for water pollution control has been accepted locally and by the state.

Increased industrial activity, soaring population, new housing and commercial development, and greater utilization of our natural resources, challenge the District to keep abreast of its responsibility to provide water pollution control for the Lake Michigan area of Lake County, Illinois.

Additional collection and treatment facilities will have to be provided in the near future in order to meet the needs within the District. Furthermore, adjacent areas linked to the North Shore by reasons of commerce, culture, business, or recreation are looking to the District for a solution to their sewage problems and for protection of their Lake Michigan water supply and recreation waters from contamination as a basis for a healthful, orderly growth and development. The basic need for the District is as real today as it was when the enabling legislation was approved by the General Assembly in 1911.

CHAIRMAN STEIN: Thank you.

MR. KLASSEN: Mr. Stein, this concludes the presentation of people to appear on behalf of the State Sanitary Water Board.

I am going to wind up here with about a two minute or a minute and half --

MR. POSTON: I would like to break in, Mr. Klassen.

There has been a lot of discussion concerning industrial pollution in the Calumet area and we have been given information on this.

I wondered whether you plan to have any industry be heard concerning their thoughts and their wastes, that they may or may not empty into the Calumet River branch.

MR. KLASSEN: Possibly my remarks yesterday or this morning were overlooked.

The legislation or, as I indicated, has exempted the Chicago Sanitary District from the jurisdiction of the State Sanitary Water Board. This is the reason that we have two conferees or co-conferees representing the State of Illinois and the Sanitary Water Board and the Metropolitan Sanitary District of Greater Chicago.

The co-conferees representing the Sanitary District was advised and I am sure that they understand this. It is their responsibility and their prerogative to call any industry or any municipality coming within the Sanitary District.

The reason that obviously when you see the map of the Sanitary Water Board, my responsibility did not include industry because the industrial complex and the industry included in this report are not within the jurisdiction of the State Sanitary Water Board area.

I just want to summarize that -- does that answer your question, Mr. Poston?

MR. POSTON: Well, I think it is important that we hear from all concerned and I just wanted to bring this out.

I guess you answered my question.

MR. KLASSEN: Yes, I assume that if the Sanitary District at the time of their presentation desires to have industry heard from, that is their prerogative.

CHAIRMAN STEIN: Mr. Poston, I thought I pointed out the Federal law: this is a state responsibility. The conferees are both Federal and state agency participants. The conferees in addition, may call upon participants whom they have invited to the conference to make statements. Invitees are limited to those who the states invite.

Now, I think as far as the Federal participation is concerned, we are not getting geared to the refinements of state jurisdictional problems and the state either invites someone or doesn't invite them. It is not our prerogative to invite anyone other than the other Federal agencies and the state agencies concerned.

MR. KLASSEN: This is -- this pattern has been, and I assume will be followed.

Well, one or two summary remarks on behalf of the State of Illinois.

The Sanitary Water Board area particularly today and it's been planned this way, you have heard primarily from the water users and those that have or represent prime interest in clean water and water pollution abatement.

We have also up to this point in the conference heard a review of the problems that are existing; some of these are new, but most of them have been known.

Some have been brought out at this hearing.

I think this is strictly a personal comment, the thought given so far to this whole pollution problem and the south end of Lake Michigan reminds me of the same thought that was given to the disposal of solid wastes in the feudal castle days and I only get this from reading, -- it is my understanding that the garbage was thrown on the floor among the rushes that were spread around on the castle floor and the garbage was kicked around until it got lost.

I have a feeling from hearing the presentations today that there are some that were hoping that this thing would be kicked around again. It's been kicked around again and the problem would be lost.

I want to say this and I am addressing, too, the industry and the municipalities, regardless of where they are, as representing the objectives and the target objectives so far as the State of Illinois is concerned, that you are the ones that have been pointed out as contributing to pollution: You are obligated to find a solution to it. You can't look to anybody else. This is your responsibility.

You know, or you should know, what you are putting into the streams without being told.

However, you have been told and in this particular conference and there can be no, as I see it, no further excuses for saying that you don't know.

There are two questions and I am directing this particularly at the people we will hear from tomorrow.

There are two questions that we would like answered, what are you going to do and when are you going to do it?

Now, when we talk about a schedule and timewise I can only say this, that if you are now discharging, whether you are a municipality or an industry, if you are now discharging pollution into these waters, as far as the Illinois Sanitary Water Board is concerned, you are already behind schedule.

Thank you.

CHAIRMAN STEIN: Thank you, thank you, Mr. Klassen.

I might indicate that part of our reputation at least from the Federal enforcement Program standpoint is that we can't get lost; we move on inexorably.

With that, I hope as many of you who can will be back tomorrow, because tomorrow is going to be Hoosier Day and I've never been in Indiana or in contact with an Indianan where I haven't thoroughly been enchanted and I am sure you all will be if you come back tomorrow.

We stand recessed until 9:30 tomorrow.

(Whereupon the proceedings in the above entitled matter were continued to March 4, 1965, at 9:30 o'clock A.M.)